Series 1956, No. 2

Issued June 1959

SOIL SURVEY

Marshall County Alabama

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
Alabama Agricultural Experiment Station
Alabama Department of Agriculture and Industries
and
Tennessee Valley Authority

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of Marshall County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; it will assist engineers in selecting sites for roads, buildings, ponds, and other structures; and it will add to the soil scientist's fund of knowledge. In making this survey soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in the growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, engineering, forestry, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared from the photographs the detailed soil map in the back of the report. Fields, woods, roads, and many other landmarks can be seen on the map.

Locating the soils

Use the index to map sheets to locate areas on the large map. The index is a map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map is found, it will be seen that boundaries of the soils are outlined and that there is a symbol for each kind of soil wherever it appears on the map. Suppose, for example, an area located on the map has the symbol HaB. The legend for the detailed map shows that this symbol identifies Hartsells fine sandy loam, gently sloping phase. This soil and all others mapped in the county are described in the subsection, Soil Series, Types, and Phases.

Finding information

Few readers will be interested in all of the report, for it has special sections for different groups. The section, General Nature of the Area, which discusses geology, climate, and other subjects, will be of interest mainly to those not familiar with the county.

Farmers and those who work with farmers will want to learn about the soils in the subsection, Soil Series, Types, and Phases, and then go to the sections, Use and Management of Soils, and Estimated Yields. In this way they first identify the soils on their farms and then learn how these soils can be managed and what yields can be expected. The soils are grouped by capability units; that is, groups of soils that need similar management and respond in about the same way. For example, in the subsection, Soil Series, Types, and Phases, Hartsells fine sandy loam, gently sloping phase, is shown to be in capability unit IIe–3. The management needed for this soil, therefore, will be found under the heading, Capability Unit IIe–3, in the section, Use and Management of Soils.

Soil scientists will find information about how the soils were formed and how they are classified in the section, Genesis, Classification, and Morphology.

Students, teachers, and other users will find information about soils and their management in various parts of the report, depending on their particular interest. Those interested in general soil areas will want to read the section, Soil Associations. This section tells about the principal kinds of soils, where they are found, and how they differ from each other.

* * * *

Fieldwork for this survey was completed in 1955. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. Marshall County is in the Northeast Alabama Soil Conservation District. Help in farm planning can be obtained from members of SCS in this district, the county agricultural agent, or the staff of the State agricultural experiment station.

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SOIL SURVEY OF MARSHALL COUNTY, ALABAMA

Soils Surveyed by K. E. FUSSELL, in charge, JAMES A. COTTON, ROBERT B. McNUTT, E. A. PERRY, W. J. REEVES, and G. A. SWENSON, United States Department of Agriculture,[1] and J. E. PASEUR, Alabama Department of Agriculture and Industries

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United States Department of Agriculture in cooperation with Alabama Agricultural Experiment Station, Alabama Department of Agriculture and Industries, and Tennessee Valley Authority

MARSHALL COUNTY is in northeastern Alabama; the total area of the county is 627 square miles, or 401,280 acres (fig. 1). Of this total area, the part of Guntersville Reservoir in the county covers 56 square miles, or 35,840 acres. Guntersville, the county seat, is about midway between Chattanooga, Tenn., and Birmingham, Ala.

The county has three physiographic divisions—sandstone plateaus, rough mountain slopes, and limestone valleys (fig. 2). An anticlinal valley, which was formed by geologic uplift and folding and later erosion, extends diagonally from the southwest to the northeast across the central part of the county. The valley is about 3 miles wide. The Tennessee River enters the county through this valley from the northeast and follows the valley to the vicinity of Guntersville. Near Guntersville the river turns northwestward and flows in a valley that it has cut.

The Tennessee River Valley and the anticlinal valley cut the county into three segments. These segments are mainly undulating to rolling plateaus that have been partly dissected by deep, steep-walled geologic erosion channels.[2] The rough mountain slopes extend from the edges of the plateaus into the limestone valleys. The general surface of the plateau areas ranges from 1,080 feet to 1,374 feet above sea level. Gunters Mountain, north of the Tennessee River, is the highest plateau. Sand Mountain is east of the anticlinal valley, and Brindley Mountain is west of it.

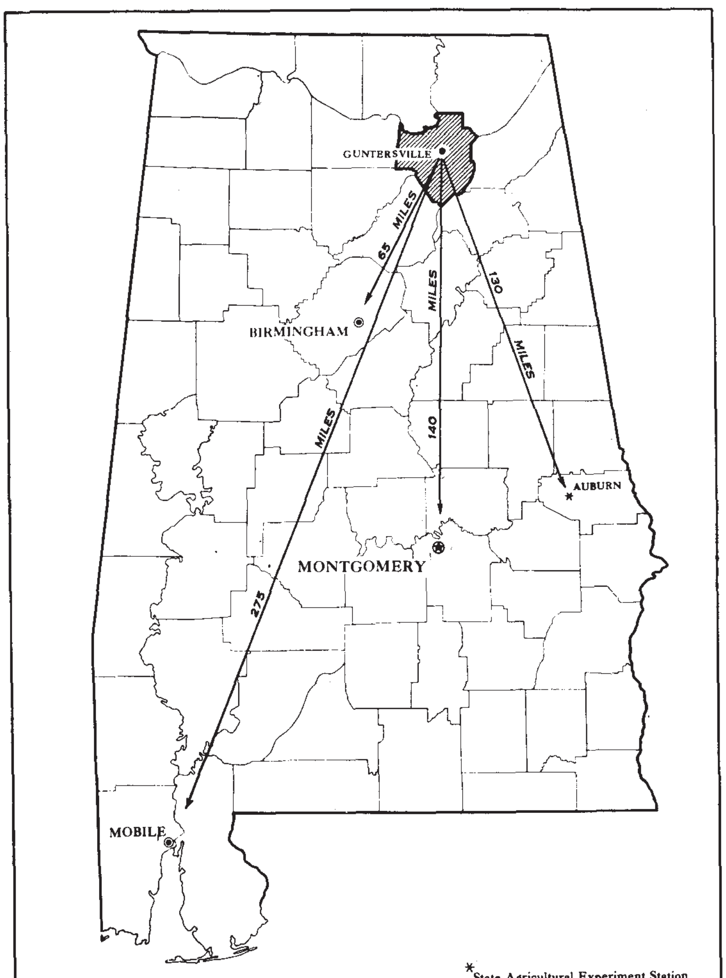

Figure 1.—**Location of Marshall County in Alabama.**

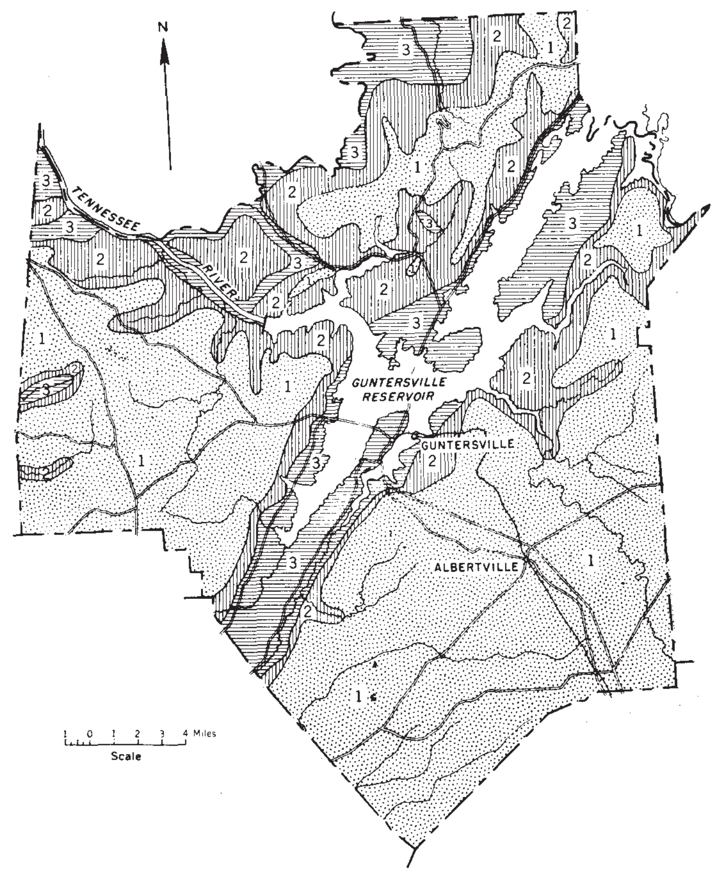

Figure 2.—**Physiographic divisions in Marshall County: (1) Sandstone plateaus, (2) rough mountain slopes, (3) limestone valleys.**

[1] Part of the fieldwork for this survey was done while the Division of Soil Survey was part of the Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952.

[2] FENNEMAN, NEVIN M. PHYSIOGRAPHY OF EASTERN UNITED STATES. 714 pp., illus. 1938.

Several parallel ridges and small valleys lie in the anticlinal valley. The surface of these valleys is a few feet higher than that of Guntersville Reservoir. The highest points on the ridges are about 900 feet. Where the Guntersville Reservoir extends into Jackson County the elevation is about 600 feet. The lowest point in the county is in the northwest where the Tennessee River enters Morgan County.

Farming has been the main occupation in Marshall County since early settlement. Cotton and corn are the chief crops. Potatoes, sweetpotatoes, sweet corn, and other vegetables are grown mainly for home use. In 1954 there were 67,697 acres of pasture in the county. The principal livestock are cattle and swine, but there are more beef cattle than dairy cattle. Much poultry is raised.

Soil Associations

In mapping a county, or other large tract, it is fairly easy to see definite differences as one travels from place to place. There are many obvious differences in shape, gradient, and length of the slopes; in the course, depth, and speed of the streams; in the width of the bordering valleys or levees; in the kinds of native plants; and even in the kinds of agriculture. With these more obvious differences, there are less easily noticed differences in the pattern of soils. The soils differ along with the other parts of the environment.

By drawing lines around the different patterns of soils on a small map, one may obtain a map of the general soil areas, or, as they are called in this report, soil associations. Such a map is useful to those who want only a general idea of the soils, or wish to compare different parts of the county, or want to locate large areas suitable for some particular kind of agriculture or other broad land use. The seven general soil areas, or kinds of soil patterns, in Marshall County are shown in colors on the small map at the back of this report. These areas are described in the following pages.

1. Hartsells-Albertville-Crossville

The Hartsells-Albertville-Crossville soil association occupies the broad, gently sloping to sloping, well-drained sandstone plateaus. It is the most extensive association in the county and occupies about 56 percent of the area. Some of the best agricultural soils on the plateaus are in this association. The Hartsells soils make up about 70 percent of the association; the Albertville soils, about 15 percent; the Crossville soils, about 10 percent; and narrow strips of local alluvium and Muskingum soils, about 5 percent. Linker and Tilsit soils make up a very small part of this association. The Crossville soils occur mainly on Gunters Mountain.

Most of the soils have a depth to bedrock that is between 10 and 60 inches. The shallow phases of the Hartsells soils are 10 to 18 inches to bedrock. Most of the acreage of Crossville soils on Gunters Mountain is 20 to 36 inches to bedrock. The shallow Hartsells soils generally have loose stone on the surface; the Crossville soils have loose stone and rock outcrops.

Almost all of this association that is suited to crops is cultivated. Most of this acreage is in capability classes II and III, and a small part is in capability class IV. The cultivated acreage totals 75 percent of the association, pasture 11 percent, and forest 11 percent. The rest is idle. The soils are suited to a wide variety of crops, including corn, cotton, small grains, and many of the legumes and grasses.

The soils are generally low in fertility, but they respond well to good management. Much of the acreage is easy to work. Soil management is moderately good. In the common cropping systems, row crops are grown frequently and large amounts of fertilizers are used. In the better systems of management, excess water is properly disposed of and rotations based on grasses are used.

Because they are droughty and have other physical limitations, the Crossville soils and the shallow Hartsells soils are not so suitable for intensive cultivation as the other soils of this association. Alfalfa, however, grows well on the moderately deep phases of the Crossville soils. Most of the soils in this association are well suited to pasture.

2. Albertville-Tilsit-Hartsells

The Albertville-Tilsit-Hartsells association occurs on the broader, generally more level areas of the sandstone plateaus. It is gently sloping to sloping and less hilly than the Hartsells-Albertville-Crossville association. It is well drained to moderately well drained. This association occurs mainly on Sand Mountain; it occupies 10 percent of the county. The Albertville and Tilsit soils make up about 75 to 80 percent of this association, and the Hartsells soils, 10 to 15 percent. The rest of the association consists of narrow strips of local alluvium and shallow Hartsells and Muskingum soils.

The soils of this association range from 20 to 60 inches deep. The moderately well drained Tilsit soils have a fragipan (compact layer in the subsoil) that impedes internal drainage. The narrow strips of local alluvium that occur along many of the drainageways are well drained to poorly drained. The hilly to steep strips that occur along some drains consist chiefly of shallow Hartsells and Muskingum soils.

Most of the soils of this association are suited to tilled crops. Most of them are in capability classes II and III. About 80 percent of the acreage is used for crops, 10 percent for pasture, and 7 percent for forest. The rest is idle. Cotton, corn, and hay are the principal crops. Although dairying and livestock raising are not common, some pasture plants are grown. Truck crops grow well on this association, especially on the coarser textured soils.

The soils of this association are low in fertility, but they respond well to fertilization and other management. They are easy to till. The more strongly sloping soils, particularly the finer textured Albertville soils, are more likely to erode than the more gently sloping soils. Erosion, however, is not a severe hazard. These soils need about the same kind of management as those of the Hartsells-Albertville-Crossville soil association. The present level of management of these two associations is about the same.

3. Stony Colluvial Land, Allen Soil Material-Rockland, Limestone-Rockland, Sandstone

The Stony colluvial land, Allen soil material-Rockland, limestone-Rockland, sandstone association occurs chiefly

on steep slopes that are stony and rocky. These slopes lie between the higher sandstone plateaus and the lower lying limestone valleys. A few limestone knobs protrude in the valley of Browns Creek. A large area of Rockland, limestone, extends from Click Hollow to the Jackson County line.

This association occupies about 20 percent of the county. Stony colluvial land, Allen soil material, makes up about 48 percent of the association; Rockland, sandstone, 25 percent; and Rockland, limestone, 25 percent. The rest consists of irregular benches along the upper edge of the limestone materials.

The soil material in this association normally is very shallow, but in some areas it is many feet deep. Most of these deep areas consist of Stony colluvial land, Allen soil material. This association has many rock outcrops, loose stones, and boulders. Narrow areas of well-drained soils occur along the upper reaches of the drainageways.

Because of the steep slopes, rock outcrops, stones, and boulders, the soil material of this association is not suited to crops. Most of the acreage is in capability class VII. About 95 percent of the association is in forest. The rest is divided about equally into pasture and idle land. On the upper slopes are deciduous hardwoods, mainly oak and hickory, and some pine. On the lower slopes that overlie limestone are solid stands of redcedar, deciduous hardwoods, or mixed hardwoods and cedars. At one time a few small benches of arable land on the mountain slopes were cleared and cropped. Most of these areas are now idle or have reverted to forest. Very few people live in the area covered by this association, as the soils would not support them.

4. Allen-Waynesboro-Cumberland-Hermitage-Minvale

The Allen-Waynesboro-Cumberland-Hermitage-Minvale association occupies only about 3 percent of the county. It occurs in the limestone valleys on old colluvium and stream terraces. The relief is mainly gently sloping to strongly sloping; a few areas are moderately steep. The Allen and Waynesboro soils make up 55 percent of this association; the Cumberland and Hermitage soils, 20 percent; and the Minvale soils, 10 percent. The remaining 15 percent consists of many small areas of Jefferson, Monongahela, Etowah, Huntington, and Pope soils. The Monongahela soils are common in the northeastern part of Paint Rock Valley. The Etowah and Huntington soils occur chiefly in the valley of Browns Creek.

The soils of this association are deep and well drained. They have a surface soil that is between sandy loam and silt loam in texture. Their subsoil is sandy loam or silty clay loam to clay. Some of the soils, chiefly the Minvale, are cherty.

The association as a whole is suited to general farming, including the raising of livestock. There are a few dairy farms. About 65 percent of the acreage is cultivated; 15 percent is in pasture; and 15 percent is in forest. The rest is idle. These soils are best suited to legume-and-grass hay, pasture, small grains, soybeans, corn, and cotton. If adequate fertilizer is applied, alfalfa grows well.

The dominant soils of this association have a firmer subsoil than the dominant soils in the Hartsells-Albertville-Crossville association and the Albertville-Tilsit-Hartsells association, and they tend to be more droughty. Furthermore, the soils of this association retain fertility longer. The response to fertilizer is good. Management is at a fairly high level, and yields are moderately high. Management could be improved by a better choice of crops and rotations, the use of more fertilizer and lime, and better control of runoff.

5. Fullerton-Clarksville-Minvale-Tellico-Upshur

The Fullerton-Clarksville-Minvale-Tellico-Upshur association occupies about 5 percent of the county. It occurs in irregular, or broken, belts parallel to the main part of the Tennessee River Valley. It lies on chert ridges and on some of the slopes below the ridges. The relief is generally strongly sloping to steep, but some lower lying soils, chiefly the Minvale, are gently sloping and sloping. The Fullerton and Clarksville soils make up about 65 percent of this association; the Minvale soils 20 percent; and the Tellico and Upshur soils 10 percent. About 5 percent of the association consists of scattered areas of Alcoa and Lobelville soils.

The soils of this association normally are moderately deep to bedrock and well drained. They were derived chiefly from cherty limestone but partly from sandstone and shale. The surface texture is mostly cherty silt loam.

Because of the steep slopes, much of this association is best suited to forest. The more nearly level Minvale soils, however, are cultivated. About 15 percent of this association is cultivated; 20 percent is in pasture; and 60 percent is in forest. The rest is idle. Many strongly sloping areas that were cultivated are now in volunteer shortleaf pine or unimproved pasture. The dominant crops are cotton, corn, and sericea lespedeza grown for hay. Truck crops are also grown.

All the soils are low in fertility. For high yields they require heavy applications of fertilizer, lime, and organic matter. Management generally is not at a high level. Yields are low. The soils normally respond well to proper management.

6. Captina-Taft-Tupelo-Colbert

The Captina-Taft-Tupelo-Colbert soil association occupies about 3 percent of the county. It occurs in the limestone valleys, mainly on flats and gentle slopes. Some areas are sloping. All the soils of the association except the Colbert soils occur on low stream terraces. This association consists of small tracts of many soils. The Captina soils make up 30 percent of the association; the Taft soils 20 percent; the Tupelo soils 20 percent; and the Colbert soils 20 percent. The rest of the association consists mostly of small acreages of Minvale, Allen-Waynesboro, Captina-Colbert, Cumberland and Hermitage, and Lindside soils, and Rockland, limestone.

The soils range from moderately well drained to somewhat poorly drained. Internal drainage is slow because these soils are clayey and plastic. The Captina soils have a fragipan that restricts the movement of water and the growth of roots.

Most of this association is used for crops and pasture. About 35 percent is cultivated; 30 percent is in pasture; and 30 percent is in forest. The rest is idle. The main crops are cotton, corn, oats, and hay. Except for the Captina soils, the soils of this association are not well

suited to cotton. The trend is to plant less cotton and more pasture on the poorly drained soils. Most of the soils are better suited to pasture than to many row crops. Except for the Egam-Newark-Huntington-Melvin association, this association has more acreage in pasture than any other association in the county.

The soils of this association are low in fertility, but if they are fertilized, pasture and corn grow well. Many of the sloping areas are eroded; yields on these areas are low. These soils need a better choice of crops and rotations; the use of more fertilizer and lime; and better control of runoff on the more strongly sloping areas.

7. Egam-Newark-Huntington-Melvin

The Egam-Newark-Huntington-Melvin association occurs mainly on the level and nearly level bottom lands along the Tennessee River, Browns Creek, Big Spring Creek, the Paint Rock River, and along Little Paint Creek in Kennamer Cove. This association occupies about 3 percent of the county. The Egam-Newark soils make up about 60 percent of the association; the Huntington soils 25 percent; the Melvin soils 10 percent; and the Newark soils 5 percent. Small areas of the Taft soils and the overwash phases of Tupelo and Monongahela soils also occur.

The soils of this association range from well drained to poorly drained. They are likely to be flooded at times. Their texture ranges from fine sandy loam to silty clay loam.

Except for the Melvin soils, most of these soils are used for crops. The Melvin soils are in forest and pasture. About 30 percent of the association is cultivated; 45 percent is in pasture; and 20 percent is in forest. The rest is idle. The main crops on the better drained areas are corn, soybeans, and hay. Alfalfa is not suitable for these soils.

The soils of this association are fertile. Farmers generally do not fertilize the soils, because the fertilizer would probably be lost when the soils are flooded. The soils generally yield more corn and pasture than the upland soils that are fertilized. The poorly drained soils need artificial drainage, but the feasibility of drainage depends on many factors—the initial cost of installation, the availability of suitable outlets, the increased productivity expected, and the need for additional acreage.

Use and Management of Soils

Each soil in Marshall County has characteristics that distinguish it from the others. In spite of these differences, many soils need much the same management and can be used for similar purposes. In the following pages the soils of the county have been placed in groups according to their relative suitability for use, kinds of management problems, and, to a large degree, their dominant physical characteristics.

Capability groups

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, and wildlife. It is a practical grouping based on the needs and limitations of the soils, the risks of damage to them, and also their response to management. There are three levels above the soil mapping unit in this grouping. They are the capability unit, subclass, and class.

The capability unit, which can also be called a management group of soils, is the lowest level of capability grouping. A capability unit is made up of soils similar in kind of management they need, in risk of damage, and in general suitability for use.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that the main limiting factor is risk of erosion if the plant cover is not maintained; "w" means excess water that retards plant growth or interferes with cultivation; "s" shows that the soils are shallow, droughty, or usually low in fertility. In some areas there is another subclass, "c," for the soils that are limited chiefly by a climate that is too cold or too dry.

The broadest grouping, the land class, is identified by Roman numerals. All the soils in one class have limitations and management problems of about the same degree, but of different kinds, as shown by the subclass. All the land classes except class I may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level, or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly but do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping; consequently, they need moderate care to prevent erosion. Other soils in class II may be slightly droughty or slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly but have a narrower range of use. These need even more careful management (fig. 3).

In class IV are soils that should be cultivated only occasionally or only under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops, but they can be used for pasture or range, for woodland, or for wildlife.

Class V (none in Marshall County) soils are nearly level and gently sloping but are droughty, wet, low in fertility, or otherwise unsuitable for cultivation.

Class VI soils are not suitable for crops, because they are steep or droughty or otherwise limited, but they give fair yields of forage or forest products. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out or pasture crops seeded.

Class VII soils provide only poor to fair yields of forage or forest products and have characteristics that limit them severely for these uses.

In class VIII (none in Marshall County) are soils that have practically no agricultural use. Some of them have value as watersheds, wildlife habitats, or for scenery.

Capability classes, subclasses, and units in Marshall County are given in the following list. In several of the subclasses the capability units are not numbered consec-

***Figure 3.*—Aerial view of class III soils near Albertville on Sand Mountain, showing meadow outlets and terrace systems.**

utively, since the system of symbols used is one that applies to the soils of several counties.

Class I.—Soils that are easy to farm and have no more than slight limitation to use. They are nearly level, productive, and not likely to erode. They need only ordinary good management.

Unit I–3: Well-drained soils on bottom lands of local alluvium of the limestone valleys.

Class II.—Soils that can be used for tilled crops with only slight risk of erosion or other limitation.

Subclass IIe: Gently sloping soils that are slightly subject to erosion.

Unit IIe–1: Well-drained gently sloping soils of limestone valleys.

Unit IIe–3: Yellow and red, well-drained, level or gently sloping soils of sandstone plateaus and stream terraces.

Unit IIe–4: Nearly level or gently sloping, moderately well drained soils on stream terraces.

Subclass IIw: Nearly level soils limited by poor drainage or by susceptibility to overflow.

Unit IIw–1: Somewhat poorly drained soils on bottom lands.

Unit IIw–2: Well-drained soils on bottom lands of general alluvium.

Class III.—Soils that can be used for tilled crops, but under moderate risk of damage through erosion, excess wetness, or other hazard.

Subclass IIIe: Gently sloping or sloping soils that are severely or moderately eroded or have moderate risk of erosion.

Unit IIIe–1: Well-drained, severely eroded gently sloping or eroded sloping soils of limestone valleys.

Unit IIIe–3: Well-drained gently sloping or sloping soils of sandstone mountains.

Unit IIIe–4: Moderately well drained soils on terraces in the limestone valleys.

Subclass IIIw: Level or nearly level soils that are somewhat poorly drained.
Unit IIIw–1: Somewhat poorly drained soils on alluvium in the limestone valleys.
Unit IIIw–2: Somewhat poorly drained soils on old colluvium and low stream terraces in the limestone valleys.

Class IV.—Soils that, because of severe limitations, can be used only occasionally for crops. These soils are best suited to pasture and forest.
Subclass IVe: Soils that are shallow or severely eroded or strongly sloping, or a combination of both.
Unit IVe–1: Severely eroded gently sloping clayey soils on stream terraces and uplands in the limestone valleys.
Unit IVe–3: Sloping eroded soils of mountain plateaus and limestone valleys.
Subclass IVw: Poorly drained, level or nearly level soils on stream bottoms. Some of these soils are likely to be flooded or scoured.
Unit IVw–3: Poorly drained soils of bottom lands.

Class VI.—Soils and land types that, because of erosion or other hazard, are suitable for pasture and forest only.
Subclass VIe: Sloping to moderately steep soils that are severely eroded, shallow, or stony, or have a combination of these limitations.
Unit VIe–1: Sloping to moderately steep, mostly deep soils of the limestone valleys and shallow soils of the sandstone plateaus.
Unit VIe–4: Gently sloping to strongly sloping soils that have boulders or rock outcrops.

Class VII.—Soils or land types that are so severely limited that they are suited to forest only.
Subclass VIIe: Soils that are not suited to pasture or crops, because they are too steep, too severely eroded, too stony, or otherwise limited.
Unit VIIe–1: Steep or severely eroded soils.
Unit VIIe–2: Stony, steep, or shallow soils.

Capability Units in Marshall County

The soils of Marshall County have been grouped in 18 capability units. The common soil characteristics, use and suitability, and management needs of the soils of each capability unit are given in the following pages. For some of the capability units, the site index is given. This is an expression of the forest-site quality, which is based on the height of the dominant trees at an age chosen arbitrarily.

Capability unit I–3

Capability unit I–3 consists of well-drained local alluvial soils of the limestone valleys. These soils are level to nearly level and occur in swales and depressions. They are:

Huntington silt loam, local alluvium phase.
Huntington loam, local alluvium phase.

These soils are moderately acid to strongly acid. They are permeable to a depth of several feet and have a high water-holding capacity. They are easy to work and have good tilth. They can be worked fairly soon after heavy rains because the water does not stand for long periods. If adequately fertilized, they are relatively high in productivity. These soils maintain a slightly higher fertility than the soils in most other capability units because they retain plant nutrients and are not likely to erode.

Use and suitability.—The soils of this unit are used for crops and pasture, although their range in crop suitability is fairly narrow. Very little of their acreage is in forest or is idle. Fescue, dallisgrass, bermudagrass, crimson clover, and white clover are commonly grown. The forest consists of hardwoods and pine. The trees are white oak, red oak, hickory, maple, shortleaf pine, and loblolly pine.

These soils are very well suited to vegetables. They are well suited to corn, soybeans, lespedeza, many pasture plants, and small grains. The small grains, however, are more likely to lodge on these soils than they are on well-drained upland soils. Although cotton grows well, yields and quality are slightly reduced by the rank stalk growth. Alfalfa generally thins out after about 2 or 3 years.

Management.—If the soils of this unit are adequately fertilized, they can be used in short rotations. A suitable rotation for large areas of these soils is corn or another row crop followed by 1 year of red clover, crimson clover, or some other hay crop. Regular additions of nitrogen, phosphate, potash, lime, and organic matter are needed to maintain fertility. Vegetables can be followed by a legume cover crop that is turned under in spring. In many places the drainageways should be sodded. These soils, especially the finer textured ones, should not be tilled when they are too wet, because they become cloddy.

Permanent pastures should be properly limed and fertilized. Normally a complete fertilizer is applied when grasses are seeded. Legumes need a fertilizer that contains only phosphate and potash. To obtain a good stand it is necessary to use clean seed, prepare a good seedbed, and to restrict grazing after seeding. Pastures are improved by periodic clipping and by regulating grazing. Clipping is needed to remove undesirable plants and to control excess growth if the pasture is undergrazed.

Capability unit IIe–1

The soils of capability unit IIe–1 are generally deep, level to gently sloping, and well drained. These red and brown soils occur in the limestone valley. They are medium textured. Except for the cherty Minvale soils, they are free of rocks and stones. The soils are:

Alcoa silt loam, eroded gently sloping phase.
Cumberland and Hermitage silt loams, eroded gently sloping phases.
Etowah loam, eroded gently sloping phase.
Minvale cherty silt loam, gently sloping phase.
Minvale cherty silt loam, eroded gently sloping phase.

These soils are moderate to low in organic matter and fertility, but they respond well to fertilizer. They have favorable moisture relations. Except for the cherty Minvale soils, their workability is very good.

Use and suitability.—These soils are used mostly for crops. Small areas are used for pasture and for forest. Very little of this unit is idle. A larger part of the Minvale soils than that of any other soil of the unit is used for pasture.

These soils are good to excellent for crops and pasture. If the soils are well fertilized, they are well suited to sericea lespedeza, bermudagrass, Kentucky 31 fescue, bahiagrass, white clover, crimson clover, and rescuegrass. Good pastures are more easily maintained on these soils than they are on the soils of capability units IIe–3 and IIIe–3. Virginia pine, loblolly pine, hickory, maple, dogwood, white oak, and red oak grow well. The site index is

about 70 to 75 for loblolly pine and 60 to 65 for shortleaf pine.

Management.—The soils of this unit can be tilled within a fairly wide range of moisture content, but they should not be worked when they are wet. If row crops are grown, tillage should be on the contour. The more sloping areas need terraces, sodded waterways, and other means of water disposal. If these soils are kept under a close-growing cover most of the time, terraces may not be needed, but tillage should always be on the contour. Although most of the soils in this unit are not so well suited to intensive use as are those in capability unit I–3, they can be used in moderately short rotations. Cotton or corn followed by 1 year or more of grasses and clovers is satisfactory. Sericea lespedeza or alfalfa can be used in a long rotation; small grains, legumes, and annual grasses can be used in a short rotation. Another row crop can be substituted for cotton or corn. If a short rotation is used, it can include an intertilled crop every other year. Short rotations, however, probably should be used only on the more nearly level areas, which must be kept highly fertile.

The soils of this unit should be fertilized at regular intervals. Legume cover crops supply some nitrogen, but additional nitrogen is needed to keep a proper balance if large quantities of the other plant nutrients are used. These soils also need additions of organic matter. Vetch, button clover, and crimson clover are good legume cover crops. Alfalfa needs much fertilizer and lime. The fertilizer probably should include boron.

Capability unit IIe–3

Capability unit IIe–3 consists of yellow and red, well-drained, level to gently sloping soils of the sandstone plateaus and stream terraces. These soils are:

- Albertville very fine sandy loam, eroded gently sloping phase.
- Allen-Waynesboro fine sandy loams, eroded gently sloping phases.
- Crossville fine sandy loam, eroded gently sloping moderately deep phase.
- Hartsells fine sandy loam, gently sloping phase.
- Hartsells fine sandy loam, eroded gently sloping phase.
- Jefferson fine sandy loam, eroded gently sloping phase.
- Linker fine sandy loam, eroded gently sloping phase.
- Tilsit very fine sandy loam, gently sloping phase.
- Tilsit very fine sandy loam, eroded gently sloping phase.

Most of these soils are deep to bedrock. At depths of 18 to 24 inches, the Tilsit soils have a fragipan that impedes the penetration of roots and moisture. The subsoil of the soils of this unit generally is more friable and more permeable than that of the soils of capability unit IIe–1. These soils have good tilth and favorable moisture relations. Runoff is a moderate hazard on the stronger slopes. Much of the original surface layer has been lost through accelerated erosion. The Linker and the Allen-Waynesboro soils are somewhat more severely eroded than the other soils of this unit.

Use and suitability.—The soils of this unit are used for a wide variety of crops. They are especially well suited to cotton and corn. If properly fertilized, these soils are highly productive. They produce sorghum and pasture of high quality. The pastures on these soils compare to those on the soils of capability unit IIe–1. Trees grow well. The trees are mostly hardwoods. The site index is about 70 to 75 for loblolly pine and about 60 to 65 for shortleaf pine.

Management.—These soils should be tilled on the contour and should have other means of disposing of excess water. The pasture plants should be seeded properly and should be adequately fertilized and limed. If managed well, these soils are suited to fairly short rotations. Cotton, corn, vegetables, and other row crops can be grown in 2- to 4-year rotations with grasses and clovers. If a winter grain is not planted after the row crop is harvested, a legume cover crop can be grown and turned under. If green-manure crops are not used, manure and nitrogen fertilizer will be needed. Legumes normally respond well to lime, potash, and phosphate. Boron should be added if alfalfa is grown.

Capability unit IIe–4

Capability unit IIe–4 consists of nearly level to gently sloping loamy soils on stream terraces. These soils have fair tilth to a depth of about 6 inches. Because of the slow permeability of the subsoil, drainage is somewhat restricted in these soils. The soils of this unit are:

- Captina silt loam, eroded gently sloping phase.
- Captina-Colbert soils, gently sloping phases.
- Monongahela fine sandy loam, eroded gently sloping phase.

These soils are low in fertility and organic matter. They are strongly acid. The moisture-holding capacity is moderate, but plant growth is slow during dry periods. Moisture is excessive during part of the growing season, but for many crops drainage is sufficient. The Colbert soils may be droughty during dry periods. Erosion is not a serious hazard.

Use and suitability.—These soils are used for crops, pasture, and forest. The main crops are corn, soybeans, grasses, and small grains. Cotton is also grown (fig. 4). Common pasture plants are Kentucky 31 fescue, white clover, and crimson clover. The trees are mostly hickory, pin oak, white oak, red oak, and maple. A few scattered pines are mixed with the hardwoods.

These soils are fair to good for crops and fair to very good for pasture. Because of low fertility and poor drainage, they are poorly suited to intensive use for crops. The site index is about 70 to 75 for loblolly pine and 60 to 65 for shortleaf pine.

***Figure 4.*—Cotton on Captina silt loam, eroded gently sloping phase. A W-waterway crosses the rows in a depression in the middle foreground.**

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Management.—These soils need more exacting management than the soils in capability units IIe–1 and IIe–3. The maintenance of good tilth is a problem. The soils should not be worked when wet, because they become cloddy. Although these soils retain plant nutrients fairly well, they need fertilizer and lime at regular intervals. Organic matter can be maintained by turning under grasses and legumes or by applying barnyard manure. Weeds should be mowed.

Capability unit IIw–1

Capability unit IIw–1 consists of nearly level soils that occur on local and general alluvium on the plateaus and in the limestone valleys. These soils range from somewhat poorly drained to well drained. They are:

Lindside silt loam, local alluvium phase.
Lobelville cherty silt loam, local alluvium phase.
Monongahela fine sandy loam, overwash phase.
Philo and Stendal soils, local alluvium phases.

The Philo and Stendal soils occur on the plateaus in swales and depressions. The rest of the soils are in the limestone valleys. The Lobelville soil is very cherty in places, but in a few areas it contains little chert. The Monongahela soil is susceptible to flooding by streams.

Use and suitability.—Most of the acreage of these soils is used for pasture or crops. Some is in forest and some is idle. Kentucky 31 fescue and whiteclover are the plants most commonly grown for hay and pasture. The forests are mainly hardwoods and some pine. The common trees are beech, poplar, pin oak, birch, and willow.

The soils in this unit are well suited to crops, pasture, and forest, but their range of suitability for crops is fairly narrow. They are well suited to corn and soybeans but are poorly suited to cotton. Most of the soils are not well suited to small grains because the rank growth causes lodging. Pasture plants grow better on these soils during dry periods than they do on the soils of capability units IIe–1, IIe–3, and IIe–4. Because of their moderately low fertility and restricted drainage, these soils are less well suited to intensive use than the soils in capability units IIe–1 and IIe–3. The site index is about 80 to 90 for loblolly pine and about 70 to 80 for shortleaf pine.

Management.—These soils should not be worked when they are too wet, because they become cloddy. They do not dry after rains so soon as the soils in capability unit IIw–2. Because of the chert, Lobelville cherty silt loam, local alluvium phase, is more difficult to till than the other soils of this unit. Organic matter can be maintained on these soils by turning under grasses and legumes or by applying barnyard manure. Fertilizer and lime should be applied at regular intervals. Weeds should be mowed at times. The waterways in many areas of the soils of this unit are in sod. These areas are fenced and used for pasture, or they are mowed for hay.

Capability unit IIw–2

Capability unit IIw–2 consists of moderately well drained to excessively drained soils that range from level to gently sloping. These soils are developing in general alluvium on the first bottoms. They are:

Egam silty clay loam.
Egam silty clay loam, sandy substratum phase.
Huntington fine sandy loam.
Huntington silt loam.
Pope fine sandy loam.
Sandy alluvial land, excessively drained.
Wolftever silt loam, eroded gently sloping phase.

Most of these soils are permeable to moisture and roots, but the Egam and Wolftever soils are slowly permeable. Except for the Sandy alluvial land, excessively drained, the moisture relations of these soils are very good and the soils are very productive. Deposits from floodwaters add to the fertility of areas that are periodically flooded, but areas that are scoured lose much of their natural fertility and their tilth is impaired. The Egam and Wolftever soils are not so easily worked as are the rest of the soils in this unit.

Use and suitability.—These soils are used for crops, pasture, and forest. The forests consist of hickory, white oak, red oak, chestnut oak, and maple. In many places some loblolly pine and shortleaf pine are mixed with the hardwoods.

These soils have a fairly narrow range of crop suitability. They are well suited to corn, grain sorghum, soybeans, winter clover, and many pasture plants. Because they are likely to be flooded, these soils are not well suited to small grains. Most of the acreage is well suited to truck crops. The Sandy alluvial land, excessively drained, should be used for pasture and trees. The soils of this unit are as well suited to pasture as are the soils of capability unit IIw–1. The site index is 80 to 90 for loblolly pine and 70 to 80 for shortleaf pine.

Management.—These soils require less exacting management than those in any other unit except capability unit I–3. If they are used in fairly short rotations, they will give relatively high yields for many years without the use of fertilizer or other amendments. These soils respond to manure, commercial fertilizer, and green-manure crops. A suitable rotation is corn or another row crop followed by Caley peas or another winter legume. Vegetables should be followed by a legume that is turned under in spring. Truck crops respond well to fertilizer.

No special tillage or cropping practices are required for the control of runoff. These soils, especially the finer textured ones, should not be tilled when they are too wet, because they become cloddy. All ditches and drains should be kept open. To provide good to excellent grazing, permanent pastures need no management other than adequate fertilizing and liming. The pastures can be improved by clipping undesirable plants and by regulating grazing.

Capability unit IIIe–1

The soils of capability unit IIIe–1 are deep, well drained, and permeable. They occur in the limestone valleys. The slopes of the soils range from 2 to 10 percent. The soils in this unit are:

Alcoa silty clay loam, severely eroded gently sloping phase.
Alcoa silt loam, eroded sloping phase.
Cumberland and Hermitage silty clay loams, severely eroded gently sloping phases.
Cumberland and Hermitage silty clay loams, severely eroded sloping phases.
Cumberland and Hermitage silt loams, eroded sloping phases.
Minvale cherty silty clay loam, severely eroded gently sloping phase.
Minvale cherty silt loam, sloping phase.
Minvale cherty silt loam, eroded sloping phase.
Minvale cherty silty clay loam, severely eroded sloping phase.

These soils retain plant nutrients well. They are strongly acid. They have a moderate moisture-holding

capacity, but infiltration is slow on the severely eroded soils, which tend to be droughty.

Use and suitability.—These soils are suited to crops and pasture, but they should not be used intensively for row crops. The growth of trees is good on the uneroded and moderately eroded soils and is fair to good on the severely eroded soils. The dominant trees are pines, but hardwoods are common on the Minvale soils that have not been cleared. The site index is about 70 to 75 for loblolly pine and 60 to 65 for shortleaf pine.

Management.—Short rotations should be used only on the uneroded or moderately eroded soils that have a good system of water disposal. Row crops should not be grown in a rotation more often than once in 3 years. More suitable is a 4- or 5-year rotation of cotton or corn, small grains, and clover or grass for hay or pasture. A longer rotation is suitable for the severely eroded soils—cotton or corn for 1 year, a small grain for 1 year, and alfalfa for 4 or 5 years. In the foregoing rotations another row crop can be substituted for cotton or corn.

The soils of this unit need systematic fertilization to maintain their fertility. Grasses and legumes should be grown to maintain organic matter and nitrogen. Phosphate and potash or barnyard manure should be applied at regular intervals, especially for alfalfa, whiteclover, and other legumes.

Capability unit IIIe–3

Capability unit IIIe–3 consists of well-drained, gently sloping to sloping soils of the sandstone mountains. These soils occur on colluvial slopes and stream terraces. They have severe conservation problems. The soils in this capability unit are:

- Albertville silty clay, severely eroded gently sloping phase.
- Albertville very fine sandy loam, eroded sloping phase.
- Allen-Waynesboro fine sandy loams, eroded sloping phases.
- Allen-Waynesboro fine sandy clay loams, severely eroded gently sloping phases.
- Allen-Waynesboro fine sandy clay loams, severely eroded sloping phases.
- Crossville loam, eroded gently sloping phase.
- Crossville fine sandy loam, eroded sloping moderately deep phase.
- Hartsells fine sandy loam, sloping phase.
- Hartsells fine sandy loam, eroded sloping phase.
- Hartsells fine sandy loam, eroded gently sloping shallow phase.
- Jefferson fine sandy loam, eroded sloping phase.
- Linker fine sandy clay loam, severely eroded gently sloping phase.
- Linker fine sandy loam, eroded sloping phase.

The Jefferson, Allen, and Waynesboro soils occur in the limestone valleys. The rest of these soils are on the plateaus. The only shallow soils in this unit are Hartsells fine sandy loam, eroded gently sloping shallow phase, and the Crossville soils. Rock outcrops are common on the Crossville soils, and erosion is a definite hazard on all the soils. These soils are generally more severely eroded or have stronger slopes than the soils of capability unit IIe–3, and they are less suitable for cultivation.

Use and suitability.—These soils are fair to good for crops and pasture. They are better suited to hay, small grains, and pasture than to row crops (fig. 5). Row crops can be grown if moderately long rotations are used. If they are carefully managed, the deeper, slightly to moderately eroded soils are well suited to row crops. The severely eroded soils are better suited to permanent pasture. Under good management, yields are fairly high.

***Figure 5.*—Harvesting sericea lespedeza on Crossville loam on a farm near Grant on Gunters Mountain.**

If they are properly fertilized, bermudagrass, sericea lespedeza, rescuegrass, and crimson clover are suitable for pasture or hay. The forests are mainly white oak, red oak, chestnut oak, maple, hickory, loblolly pine, shortleaf pine, and Virginia pine. Trees grow faster on the less severely eroded deep soils than on the severely eroded soils. The site index is about 70 to 75 for loblolly pine and about 60 to 65 for shortleaf pine.

Management.—These soils are fairly easy to work, but they are not so easy to work as the soils of capability unit IIe–3. Fields should be planted on the contour, and a close-growing crop should be grown as much of the time as possible. If row crops are planted, terraces and other means of water control are needed (fig. 6). Where it is not necessary to grow row crops, runoff can be controlled by planting grasses, clovers, perennial legumes, or other close-growing crops. Weeds and other undesirable plants should be clipped. A suitable rotation for these soils is corn or cotton for 1 year, a small grain for 1 year, and grass for hay or pasture for 2 or 3 years. Also suitable is a longer rotation of cotton or corn for 1 year, a small grain for 1 year, and alfalfa for 3 to 5 years. Alfalfa, however, should not be grown on the Crossville soils or on Hartsells fine sandy loam, eroded gently sloping shallow phase.

These soils need applications of lime, phosphate, and potash. The nitrogen can be maintained by using green-manure crops, grass and cover crops, and barnyard manure.

***Figure 6.*—Vegetated outlets for water disposal in natural draws or depressions on Hartsells fine sandy loam, eroded sloping phase.**

If hay, pasture, a winter legume, or a row crop is grown, a nitrogen fertilizer can be added.

Capability unit IIIe–4

Capability unit IIIe–4 consists of moderately well drained soils that occur on gentle slopes in the limestone valleys. These soils have a silt loam to a silty clay loam surface soil and a silty clay loam to clay subsoil. They are moderately to severely eroded. The soils of this capability unit are:

Captina silty clay loam, severely eroded gently sloping phase.
Colbert silty clay loam, eroded gently sloping phase.
Taft silt loam, eroded gently sloping phase.
Tupelo silt loam, eroded gently sloping phase.

These soils are low in fertility but respond fairly well to fertilizers. They are moderately productive. Their workability is fairly good, but it varies according to the depth of the surface soil. The severely eroded Captina soil has less favorable tilth and less water-holding capacity than have the rest of the soils in this unit.

Use and suitability.—These soils are better suited to small grains, hay, and pasture than they are to corn and cotton. They are better suited to corn than to cotton, but yields for both cotton and corn are low because soil moisture is scarce during dry periods. Yields of fall-sown small grains and other early maturing crops are higher. These soils are well suited to oats, crimson clover, white clover, and Kentucky 31 fescue. They are not very well suited to truck crops, because they are not so easily worked as some of the more sandy soils. Root crops do not develop well. Cedar trees are common and grow well on all the soils of this unit except the Captina soil. The cedars are used for fence posts. The hardwoods and other trees are usually dwarfed and are of little value for timber.

Management.—If these soils are used for legumes, they need fertilizer and lime. Pastures normally dry out earlier in summer and fall than they do on most of the soils of capability unit IIIe–3. If the pastures are undergrazed, they should be mowed to control undesirable plants. The pastures should not be overgrazed. Rotations should be of moderate length, and the soils need to be kept in close-growing vegetation most of the time. Row crops should be followed immediately by a cover crop. Organic matter, plant nutrients, and lime must be replenished regularly if the soils are cultivated. Erosion must be prevented. If erosion is adequately controlled, these soils retain their plant nutrients. If the soils are tilled when they are wet, they will clod.

Capability unit IIIw–1

Capability unit IIIw–1 consists of deep, somewhat poorly drained soils that occur on general and local alluvium in the limestone valleys. The soils in this unit are:

Colbert silty clay loam, overwash phase.
Egam-Newark silty clay loams.
Newark fine sandy loam.
Newark loam, local alluvium phase.
Tupelo silt loam, overwash phase.

The tilth generally is not so favorable for these soils as it is for those of capability unit IIw–2. The soils that occur on general alluvium are likely to be flooded at times, but they receive fresh supplies of plant nutrients from the sediments deposited by the water. The slow permeability and poor drainage restrict the range of crop suitability on most of the soils in this unit. Suitable crops, however, are very productive on these soils.

Use and suitability.—These soils are well suited to corn, but all or part of a corn crop may be flooded and lost. They are well suited to soybeans and many pasture plants. They are not well suited to alfalfa, most small grains, and cotton. Hardwoods grow well. The dominant trees are gum, poplar, birch, beech, pin oak, and willow. Loblolly pine and shortleaf pine are mixed with the hardwoods. The site index is about 80 to 90 for loblolly pine and about 70 to 80 for shortleaf pine.

Management.—No special management is needed to control runoff. These soils, especially the finer textured ones, should not be tilled when they are too wet, because they will clod. Many areas that have suitable outlets can be improved by artificial drainage. The expense of artificial drainage is not justified in areas that do not have suitable outlets. Pastures can be improved by applying fertilizer and lime and by controlling grazing and mowing weeds.

Because they are likely to be flooded, most of these soils are not fertilized. If these soils are used in fairly short rotations, relatively high yields can be obtained for many successive years without the use of fertilizer or other amendments. These soils, however, respond well to fertilizer, barnyard manure, and green-manure crops. A rotation of corn followed by Caley peas for 1 year is suited to most of these soils.

Capability unit IIIw–2

Capability unit IIIw–2 consists of level to nearly level, somewhat poorly drained soils that have developed on old colluvium and low stream terraces in the limestone valleys. The soils in this unit are:

Hollywood clay.
Taft silt loam, level phase.
Tupelo silt loam, level phase.
Tyler fine sandy loam.

With the exception of Hollywood clay, these soils are low in fertility. They have either fragipans or claypans that retard the penetration of water and roots. The texture and consistence of the Tupelo and Hollywood soils restrict their use. During rainy periods water stands on the surface of these soils for long periods.

Use and suitability.—These soils generally are not suited to row crops. If they are well fertilized, limed, and properly seeded, they produce good pasture. They are particularly well suited to pasture because the pasture plants grow longer during the dry season than they do on the soils of capability units IIIe–1, IIIe–3, and IIIe–4. Kentucky 31 fescue, whiteclover, and other pasture plants are suitable. Corn and soybeans grow well if the growing season is not too wet. These soils are not suited to cotton, alfalfa, most truck crops, and vegetables. Hardwoods grow well. The dominant trees are pin oak, beech, birch, gum, and poplar. Pines are not commonly grown. The site index is 80 to 90 for loblolly pine and 70 to 80 for shortleaf pine.

Management.—These soils should not be worked when they are too wet, because they clod. They have no risk of erosion and need no special practices to control runoff. Some areas, however, would be better suited to crops if they were artificially drained.

If they are adequately fertilized, these soils can be used intensively for row crops. They retain plant nutrients

well. Because they are wet, they are well suited to some hay crops and pasture. Plant nutrients need to be applied regularly, and lime is required for all except the Hollywood soil. Organic matter can be maintained either by turning under grass and clover crops or by applying barnyard manure. Weeds should be mowed.

Capability unit IVe–1

The soils of capability unit IVe–1 occur on slopes ranging from 2 to 10 percent. Because of the shallow depth to the very slowly permeable clayey subsoil and bedrock, the internal drainage of these soils is restricted. This condition causes runoff to accumulate and greatly limits the root zone. The soils in this unit are:

Colbert silty clay, severely eroded gently sloping phase.
Tupelo silty clay loam, severely eroded gently sloping phase.

These soils are droughty during dry periods, even though they have a moderate moisture-holding capacity. They are low in fertility and organic matter. Their reaction is strongly acid. Because of the clayey compact plow layer, these soils have poor tilth and are difficult to work. In places where the bedrock is exposed, the Colbert soil is not suitable for cultivation.

Use and suitability.—These soils are not well suited to row crops. If adequately fertilized, they are fairly well suited to many grasses and legumes grown for hay and pasture. Because of insufficient soil moisture, yields of crops are low. Cedars are the most common trees grown on these soils. In most places they are cut and used for fence posts. White oak, red oak, pin oak, maple, and other hardwoods grow very slowly on these soils.

Management.—If row crops are grown, very long rotations should be used. Fall-sown small grains and other early maturing crops give more consistent yields than row crops. These soils need regular additions of fertilizer. If the soils are adequately fertilized, limed, and seeded, bermudagrass, lespedeza, and crimson clover do well. The lespedeza may be short lived.

Capability unit IVe–3

The soils of capability unit IVe–3 are deep and well drained. They are mostly residual soils that occupy gentle to strong slopes. These soils occur on the mountain plateaus and in the limestone valleys. The soils in this capability unit are:

Albertville silty clay, severely eroded sloping phase.
Alcoa silty clay loam, severely eroded sloping phase.
Allen-Waynesboro fine sandy loams, strongly sloping phases.
Crossville fine sandy clay loam, severely eroded sloping moderately deep phase.
Fullerton cherty silt loam, strongly sloping phase.
Fullerton cherty silt loam, eroded strongly sloping phase.
Hartsells fine sandy clay loam, severely eroded sloping phase.
Hartsells fine sandy clay loam, severely eroded gently sloping shallow phase.
Hartsells fine sandy loam, eroded sloping shallow phase.
Linker fine sandy loam, eroded strongly sloping phase.
Linker fine sandy clay loam, severely eroded sloping phase.

Because most of the soils in this unit have strong slopes and are moderately eroded, they are difficult to conserve. Plowing has exposed the subsoil in the more severely eroded areas. In some places the original surface soil has been lost through erosion; in other places it is as much as 10 inches deep.

Use and suitability.—The soils of this unit are better suited to pasture than to cultivated crops. They are better for hay and small grains than for row crops, but row crops may be grown in long rotations. If these soils are used for pasture, they should be properly fertilized, limed, and seeded. They are suited to sericea lespedeza grown for summer pasture and rescuegrass grown for winter pasture. Bermudagrass gives a protective cover and good grazing. These soils should be used for permanent pasture or hay where they occur near the soils of capability units IIe–3 and IIIe–3. Pine trees grow well on these soils, especially on the less severely eroded areas. The site index is about 70 to 75 for loblolly pine and about 60 to 65 for shortleaf pine. The hardwoods commonly grown are white oak, red oak, chestnut oak, hickory, and maple.

Management.—These soils should be tilled on the contour. Because erosion is a hazard, drainage systems should be installed to control runoff. These soils need applications of lime, phosphate, potash, and nitrogen. The nitrogen can be supplied through commercial fertilizer, barnyard manure, or by plowing under green-manure crops. The use of perennial grasses and legumes helps to maintain plant nutrients and organic matter and to reduce runoff. The shortest rotation that should be used is corn or cotton for 1 year followed by sericea lespedeza for hay or pasture for 3 or 4 years. Alfalfa can be substituted for lespedeza on the deep soils that are not seriously eroded. Weeds and other harmful plants should be clipped, and overgrazing should be avoided.

Capability unit IVw–3

Capability unit IVw–3 consists of poorly drained soils that occur in general alluvium on level to nearly level bottoms. These soils range in texture from fine sandy loam to silty clay loam. They are:

Atkins soils.
Melvin silt loam and silty clay loam.
Melvin fine sandy loam.
Purdy fine sandy loam.
Robertsville silty clay loam.

The Atkins soils occur on the sandstone plateaus. All the rest of the soils of this unit occur in the limestone valleys. The soils that occur on the first bottoms are likely to be flooded at times, but the soils on the adjacent low stream terraces are not subject to flooding. Some of the soils on the first bottoms, especially the Melvin soils, are likely to be scoured by stream overflow. Water stands on some of these soils for long periods. These soils are difficult to work, but they are easy to conserve. They retain plant nutrients fairly well.

Use and suitability.—These soils are better suited to pasture and forest than to cultivated crops. Under favorable moisture conditions, however, some areas have produced fair yields of Caley peas, soybeans, corn, and other crops. Hardwood forests do well on these soils. The most common trees are pin oak, gum, beech, birch, and willow. Some loblolly pine and shortleaf pine are mixed with the hardwoods. The site index is about 85 to 90 for loblolly pine and about 75 to 80 for shortleaf pine.

Management.—These soils do not need special management to control runoff. Yields probably would be increased if the soils were artificially drained (fig. 7). Suitable outlets, however, must be available, and the cost of installation must be considered. The soils in this unit that occur on low stream terraces need heavier applications of fertilizers and lime than the soils that

Figure 7.—**Excess water is commonly removed from low, flat, wet areas by drainage ditches.**

occur on first bottoms. Additions of organic matter are especially beneficial. These soils are well suited to a pasture mixture of whiteclover and Kentucky 31 fescue.

Capability unit VIe–1

Capability unit VIe–1 consists of moderately well drained to excessively drained soils in the limestone valleys and on the sandstone plateaus. Most of the soils on the plateaus are shallow to bedrock. Those in the limestone valleys occur mainly on old colluvium and are generally deep and well drained. The soils of this unit range in texture from fine sandy loam to silty clay. They are:

- Albertville silty clay, severely eroded sloping shallow phase.
- Allen-Waynesboro fine sandy clay loams, severely eroded strongly sloping phases.
- Allen-Waynesboro fine sandy loams, moderately steep phases.
- Cumberland and Hermitage silty clay loams, severely eroded strongly sloping phases.
- Fullerton cherty silty clay loam, severely eroded strongly sloping phase.
- Fullerton cherty silt loam, moderately steep phase.
- Fullerton cherty silt loam, eroded moderately steep phase.
- Hartsells fine sandy loam, eroded strongly sloping shallow phase.
- Jefferson fine sandy loam, moderately steep phase.
- Linker fine sandy clay loam, severely eroded strongly sloping phase.
- Muskingum fine sandy loam, eroded sloping phase.
- Muskingum fine sandy loam, eroded strongly sloping phase.
- Muskingum fine sandy loam, eroded moderately steep phase.
- Tellico and Upshur soils, eroded strongly sloping phases.

These soils are low in fertility. Their capacity to retain plant nutrients is low. Their moisture-holding capacity varies, mainly according to the depth of the soil and the degree to which it is eroded.

Use and suitability.—These soils are better suited to pasture than to crops. Most of the soils are well suited to hardwoods and pine. The trees grow faster on the less severely eroded, deeper soils. On the deeper soils, the site index is about 65 to 75 for loblolly pine; on the severely eroded shallow soils, the site index is about 60 to 70. On both the shallow and deep soils, the site index for shortleaf pine is about 10 less than that for loblolly pine. Hardwood trees that grow well on these soils are white oak, red oak, chestnut oak, hickory, and maple.

Management.—Where feasible, these soils should be kept in permanent meadow and pasture. Long rotations should be used in areas that must be cropped. Row crops should not be grown in these rotations more often than once in 6 or 7 years. Then tillage should be on the contour. On the longer slopes, stripcropping will help in controlling erosion. Because these soils are too steep for terracing, erosion is a definite problem if row crops are grown as often as once in 4 or 5 years. Moderate to heavy applications of a complete fertilizer and lime are needed to establish a good pasture. Sericea lespedeza grows well on these soils, even in the less fertile areas.

Capability unit VIe–4

Capability unit VIe–4 consists of sloping to strongly sloping soils. These soils normally have either rock outcrops or large boulders on the surface. They are:

- Allen and Jefferson stony fine sandy loams, strongly sloping phases.
- Colbert silty clay, severely eroded sloping phase.
- Crossville loam, eroded sloping phase.
- Stony smooth land, limestone.

Except for the Allen and Jefferson soils, the soils of this unit have a low water-holding capacity. Because runoff is rapid in most places, these soils are very likely to erode.

Use and suitability.—These soils are not suited to crops. Because of the loose stones on the surface, some areas are not suited to any agricultural use. Most of the acreage is best suited to pasture. If adequately fertilized, the pastures are of moderate carrying capacity. These soils generally are well suited to bermudagrass, whiteclover, sericea lespedeza, and rescuegrass. Because of the unfavorable moisture content of most of these soils, yields are low.

Cedar trees are common. They grow best on the clayey soils. Other trees are not so well suited to these soils as cedar, and they are normally dwarfed. Hardwoods and pines grow on the sandy soils; the hardwoods are dominant. The most common trees grown are chestnut oak, white oak, red oak, hickory, and maple. The site index is 65 to 75 for loblolly pine and 55 to 65 for shortleaf pine.

Management.—Regular fertilization, applications of lime, and additions of organic matter are needed to keep these soils fertile. These soils should be properly seeded. The pastures should not be overgrazed, and undesirable plants should be clipped.

Capability unit VIIe–1

Capability unit VIIe–1 consists of a miscellaneous land type and soils that are not suited to crops or pasture because they are too steep or too severely eroded, or both. This unit consists of:

- Albertville silty clay, severely eroded strongly sloping shallow phase.
- Cumberland and Hermitage silty clay loams, severely eroded moderately steep phases.
- Fullerton-Clarksville cherty silt loams, steep phases.
- Gullied land.
- Montevallo shaly silt loam, severely eroded steep phase.
- Tellico and Upshur soils, eroded moderately steep phases.
- Tellico and Upshur soils, steep phases.

These mapping units are shallow and droughty. Although the soils in this capability unit are not physically suited to crops or pasture, farmers sometimes have to use them because no better land is available.

Use and suitability.—The acreage of this capability unit is best suited to forest, and much of it has stands of oak, hickory, pine, and cedar. A plant cover can be established on the rough, gullied areas by planting sericea

lespedeza and kudzu. It is difficult, however, to establish the lespedeza. Except where the soil material was derived from argillaceous limestone, pine trees are dominant on badly gullied areas. Cedars are dominant in the limestone areas. Pines grow slowly on these soils. In most areas, the site index is 55 to 65 for loblolly pine and 40 to 55 for shortleaf pine. On steep uneroded areas, the site index is slightly higher for both species.

Management.—The acreage of this capability unit that must be used for row crops should be adequately fertilized and limed and the organic matter kept at a high level. In the rotations, close-growing hay, pasture, and small grains should be grown much of the time. The soils need to be managed so that they will hold as much moisture as possible. Runoff should be controlled. Some places need a thick vegetative cover to hold down the soil. Fields should be tilled on the contour. On the longer slopes, stripcropping is beneficial. None of these soils should be terraced. Proper seeding, liming, and fertilizing are needed on pasture. Generally, a large part of the pasture sod should consist of suitable legumes. The greatest problem in maintaining good pasture on these steep soils is the difficulty in applying fertilizer and lime and in clipping weeds.

Capability unit VIIe–2

The acreage that makes up capability unit VIIe–2 is too steep, stony, and shallow for crops or pasture. This capability unit consists of the following soils and miscellaneous land types:

- Allen and Jefferson stony fine sandy loams, moderately steep phases.
- Muskingum stony fine sandy loam, strongly sloping phase.
- Rockland, sandstone.
- Rockland, limestone.
- Stony colluvial land, Allen soil material.

Use and suitability.—Much of this soil is in forest, chiefly oak, hickory, pine, and cedar (see background, fig. 8). Chestnut oak, white oak, red oak, and hickory grow on the sandy soils. Cedar is more common on limestone soils. Shortleaf pine and loblolly pine are common in stony areas that were cleared at one time. Pines are better suited to the rocky sites than are hardwoods. The site index is 70 to 75 for loblolly pine and 60 to 65 for shortleaf pine. Pines probably should be planted on the most favorable sites.

Management.—Areas that are not already in forest should be forested. Some areas will reforest themselves if they are protected from fires and overgrazing; other areas must be replanted. The management of forest should include: (1) Maintenance of full stands of suitable trees; (2) systematic cutting and thinning out of undesirable trees; (3) selective harvesting of mature trees; (4) protection from damage by fire and browsing and trampling of animals; (5) thinning the crowded stands to a spacing consistent with the site index.

Estimated Yields

Average acre yields of the principal crops to be expected on the soils of Marshall County are listed in table 1. In columns A are yields to be expected under the management now prevailing in the county; in columns B, the yields to be expected under the best practical management. The yields in columns B generally are much higher than those in columns A. For some soils the yields in both columns, particularly for crops of high value, may be about the same because the management now used is so near the best management known.

***Figure 8.*—In the foreground, sericea lespedeza on Allen-Waynesboro fine sandy loams. The lower two-thirds of the steep wooded area is Stony colluvial land, Allen soil material. The top third is Rockland, sandstone.**

The yield estimates are based on information obtained from farmers of the county, the county agricultural workers, and from observations made during the survey. Data giving specific crop yields by kinds of soil are not generally available. Therefore, the yields given are estimated average yields that can be expected over a period of years. The yields do not apply to specific tracts of land for any particular year. Climate fluctuates from year to year, and management varies from farm to farm. Small areas within some soils differ from areas surrounding them and therefore do not yield the same. A soil that has an abnormally deep surface soil will produce yields higher than the average.

The requirements of good management vary according to the soils. The management suggested for each capability unit in the section, Use and Management of Soils, is considered necessary if the soils of the units are to produce the yields in columns B. In addition to ordinary management, improved management includes: The proper choice and rotation of crops; the use of commercial fertilizer, lime, and manure; proper tillage; the return of organic matter to the soil; an adequate water-control system; and means to conserve soil material, plant nutrients, and soil moisture.

The yields in columns B may be considered production goals. By comparing yields in columns B with those in columns A, a farmer should get an idea of the response that a soil will make to good management. On practically all soils of the county, more intensive management will bring better yields.

TABLE 1.—*Expected average acre yields of principal crops under two levels of management on the soils of Marshall County, Ala.*

[Yields in columns A are to be expected under common management; those in columns B, under the best practices considered feasible. Dashed lines indicate that the soil is poorly suited to the crop specified]

Soil	Field corn		Cotton (lint)		Alfalfa hay		Soybean hay		Sericea hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
Albertville very fine sandy loam:	*Bu.*	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Eroded gently sloping phase	28	45	400	600	2.0	3.0	1.0	1.5	1.5	2.5	60	160
Eroded sloping phase	25	40	350	550	1.8	2.8	1.0	1.5	1.3	2.3	55	150
Albertville silty clay:												
Severely eroded gently sloping phase	25	40	350	500	1.5	2.5	.5	1.0	1.1	2.0	55	150
Severely eroded sloping phase	20	30	300	400	1.3	2.0	----	----	1.0	1.5	50	140
Severely eroded sloping shallow phase	----	----	----	----	----	----	----	----	.5	1.0	40	100
Severely eroded strongly sloping shallow phase	----	----	----	----	----	----	----	----	----	----	35	85
Alcoa silt loam:												
Eroded gently sloping phase	30	60	350	550	2.5	3.0	1.0	1.5	1.5	2.5	80	160
Eroded sloping phase	28	55	300	500	2.4	2.8	1.0	1.5	1.5	2.0	75	150
Alcoa silty clay loam:												
Severely eroded gently sloping phase	28	55	300	450	2.2	2.5	.5	1.0	1.4	1.8	70	140
Severely eroded sloping phase	25	40	275	400	2.0	2.3	.4	.9	1.2	1.6	65	130
Allen and Jefferson stony fine sandy loams:												
Strongly sloping phases	----	----	----	----	----	----	----	----	----	----	----	----
Moderately steep phases	----	----	----	----	----	----	----	----	----	----	----	----
Allen-Waynesboro fine sandy loams:												
Eroded gently sloping phases	45	75	450	750	3.0	3.5	1.5	2.0	1.5	2.5	85	155
Eroded sloping phases	38	65	400	700	2.8	3.2	1.4	1.8	1.3	2.3	80	150
Strongly sloping phases	20	45	350	550	----	----	----	----	1.2	2.0	75	145
Moderately steep phases	----	----	----	----	----	----	----	----	----	----	70	140
Allen-Waynesboro fine sandy clay loams:												
Severely eroded gently sloping phases	30	60	400	650	2.8	3.2	1.4	1.8	1.0	1.8	80	150
Severely eroded sloping phases	25	55	350	550	2.0	2.5	1.3	1.7	1.0	1.8	75	145
Severely eroded strongly sloping phases	----	----	----	----	----	----	----	----	----	----	70	140
Atkins soils	----	----	----	----	----	----	----	----	----	----	120	180
Captina silt loam, eroded gently sloping phase	25	50	375	500	----	----	----	----	.5	1.2	90	160
Captina silty clay loam, severely eroded gently sloping phase	----	----	----	----	----	----	----	----	.5	1.0	75	145
Captina-Colbert soils, gently sloping phases	40	70	350	475	----	----	1.0	1.5	1.0	1.5	90	160
Colbert silty clay loam:												
Eroded gently sloping phase	20	40	250	400	----	----	----	----	1.5	2.0	65	130
Overwash phase	35	65	----	----	----	----	1.0	1.5	----	----	120	180
Colbert silty clay:												
Severely eroded gently sloping phase	18	35	----	----	----	----	----	----	1.0	1.5	50	100
Severely eroded sloping phase	----	----	----	----	----	----	----	----	.8	1.3	40	85
Crossville loam:												
Eroded gently sloping phase	25	40	320	400	----	----	1.0	1.5	1.2	2.0	75	145
Eroded sloping phase	----	----	----	----	----	----	----	----	1.0	1.8	60	120
Crossville fine sandy loam:												
Eroded gently sloping moderately deep phase	35	65	500	800	2.0	3.0	1.5	2.0	1.5	2.5	60	160
Eroded sloping moderately deep phase	30	60	450	750	1.8	2.8	1.0	1.5	1.5	2.5	55	150
Crossville fine sandy clay loam, severely eroded sloping moderately deep phase	25	45	350	500	1.5	2.5	1.0	1.5	1.2	2.0	50	140
Cumberland and Hermitage silt loams:												
Eroded gently sloping phases	40	70	450	750	3.0	3.5	1.0	1.5	1.5	2.5	90	175
Eroded sloping phases	35	65	400	700	2.8	3.2	1.0	1.5	1.5	2.5	80	165
Cumberland and Hermitage silty clay loams:												
Severely eroded gently sloping phases	35	65	400	650	2.8	3.2	.5	1.0	1.2	2.2	80	160
Severely eroded sloping phases	30	55	350	550	----	----	----	----	1.0	2.0	75	145
Severely eroded strongly sloping phases	----	----	----	----	----	----	----	----	.8	1.3	70	140
Severely eroded moderately steep phases	----	----	----	----	----	----	----	----	----	----	----	----
Egam silty clay loam	45	75	450	750	----	----	1.5	2.0	----	----	120	180
Sandy substratum phase	45	75	450	750	----	----	1.5	2.0	----	----	120	180
Egam-Newark silty clay loams	45	80	----	----	----	----	1.5	2.0	----	----	120	180
Etowah loam, eroded gently sloping phase	45	80	500	750	3.0	3.5	1.0	1.5	1.5	2.5	85	155
Fullerton cherty silt loam:												
Strongly sloping phase	25	50	350	500	1.0	1.8	----	----	1.5	2.5	70	140
Eroded strongly sloping phase	20	45	325	475	1.0	1.8	----	----	1.5	2.5	65	130
Moderately steep phase	----	----	----	----	----	----	----	----	----	----	55	110
Eroded moderately steep phase	----	----	----	----	----	----	----	----	----	----	50	100
Fullerton cherty silty clay loam, severely eroded strongly sloping phase	----	----	----	----	----	----	----	----	----	----	50	100

See footnotes at end of table.

TABLE 1.—*Expected average acre yields of principal crops under two levels of management on the soils of Marshall County, Ala.*—Continued

Soil	Field corn		Cotton (lint)		Alfalfa hay		Soybean hay		Sericea hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Fullerton-Clarksville cherty silt loams, steep phases	----	----	----	----	----	----	----	----	----	----	----	----
Gullied land	----	----	----	----	----	----	----	----	----	----	----	----
Hartsells fine sandy loam:												
Gently sloping phase	35	65	500	800	2.5	3.0	1.5	2.0	1.5	2.5	60	160
Eroded gently sloping phase	35	65	500	800	2.5	3.0	1.5	2.0	1.5	2.5	60	160
Sloping phase	30	60	450	750	2.3	2.8	1.0	1.5	1.4	2.4	55	150
Eroded sloping phase	30	60	450	750	2.3	2.8	1.0	1.5	1.4	2.4	55	150
Eroded gently sloping shallow phase	28	45	350	500	----	----	----	----	1.3	2.3	45	130
Eroded sloping shallow phase	25	40	300	400	----	----	----	----	1.0	2.0	40	120
Eroded strongly sloping shallow phase	----	----	----	----	----	----	----	----	1.0	1.5	30	110
Hartsells fine sandy clay loam:												
Severely eroded sloping phase	25	45	350	500	1.5	2.5	1.0	1.5	1.3	2.0	50	140
Severely eroded gently sloping shallow phase	25	40	300	400	----	----	----	----	.8	1.3	40	120
Hollywood clay	30	45	----	300	----	----	----	----	----	----	80	150
Huntington silt loam	45	80	450	750	----	----	1.5	2.0	----	----	120	180
Local alluvium phase	50	80	400	[2] 750	----	----	1.5	2.0	----	----	120	180
Huntington fine sandy loam	45	80	450	750	----	----	1.5	2.0	----	----	120	180
Huntington loam, local alluvium phase	45	80	400	[2] 750	----	----	1.5	2.0	----	----	120	180
Jefferson fine sandy loam:												
Eroded gently sloping phase	45	75	475	750	2.8	3.2	1.5	2.0	1.5	2.5	85	155
Eroded sloping phase	38	70	475	750	2.5	3.0	1.0	1.5	1.5	2.5	80	150
Moderately steep phase	----	----	----	----	----	----	----	----	----	----	65	130
Lindside silt loam, local alluvium phase	45	80	----	----	----	----	1.5	2.0	----	----	120	180
Linker fine sandy loam:												
Eroded gently sloping phase	45	75	500	800	2.5	3.0	1.5	2.0	1.5	2.5	85	155
Eroded sloping phase	38	70	500	800	2.5	3.0	1.0	1.5	1.5	2.5	80	150
Eroded strongly sloping phase	25	50	400	600	----	----	----	----	1.3	2.3	75	145
Linker fine sandy clay loam:												
Severely eroded gently sloping phase	35	65	450	650	2.3	2.8	1.0	1.5	1.3	2.0	80	150
Severely eroded sloping phase	25	55	400	600	2.0	2.5	.5	1.0	1.2	1.8	70	140
Severely eroded strongly sloping phase	----	----	----	----	----	----	----	----	----	----	65	130
Lobelville cherty silt loam, local alluvium phase	30	[3] 60	450	[3] 700	----	----	1.5	2.0	----	----	120	180
Melvin silt loam and silty clay loam	18	38	----	----	----	----	1.8	2.3	----	----	120	180
Melvin fine sandy loam	20	40	----	----	----	----	1.5	2.0	----	----	120	180
Minvale cherty silt loam:												
Gently sloping phase	45	75	450	700	2.8	3.2	1.0	1.5	1.5	2.0	90	160
Eroded gently sloping phase	40	70	425	675	2.5	3.0	.9	1.3	1.5	2.0	85	155
Sloping phase	40	70	400	650	2.3	2.8	.9	1.3	1.4	1.9	85	155
Eroded sloping phase	38	65	370	620	2.0	2.5	.8	1.2	1.4	1.9	80	150
Minvale cherty silty clay loam:												
Severely eroded gently sloping phase	30	60	375	600	2.0	2.5	.5	1.0	1.3	1.8	80	150
Severely eroded sloping phase	25	55	325	500	1.5	2.0	----	----	1.2	1 7	75	145
Monongahela fine sandy loam:												
Eroded gently sloping phase	30	60	400	600	----	----	1.0	1.5	.5	1.5	90	160
Overwash phase	40	80	----	----	----	----	1.5	2.0	----	----	120	180
Montevallo shaly silt loam, severely eroded steep phase	----	----	----	----	----	----	----	----	----	----	----	----
Muskingum fine sandy loam:												
Eroded sloping phase	----	----	----	----	----	----	----	----	----	----	50	100
Eroded strongly sloping phase	----	----	----	----	----	----	----	----	----	----	50	100
Eroded moderately steep phase	----	----	----	----	----	----	----	----	----	----	45	90
Muskingum stony fine sandy loam, strongly sloping phase	----	----	----	----	----	----	----	----	----	----	----	----
Newark fine sandy loam	45	80	----	----	----	----	1.5	2.0	----	----	120	180
Newark loam, local alluvium phase	45	80	----	----	----	----	1.5	2.0	----	----	120	180
Philo and Stendal soils, local alluvium phases	45	80	----	----	----	----	1.5	2.0	----	----	120	180
Pope fine sandy loam	45	80	450	750	----	----	1.5	2.0	----	----	120	180
Purdy fine sandy loam	----	----	----	----	----	----	----	----	----	----	90	150
Robertsville silty clay loam	----	----	----	----	----	----	----	----	----	----	90	160
Rockland:												
Limestone	----	----	----	----	----	----	----	----	----	----	----	----
Sandstone	----	----	----	----	----	----	----	----	----	----	----	----
Sandy alluvial land, excessively drained	----	----	----	----	----	----	----	----	----	----	20	30
Stony colluvial land, Allen soil material	----	----	----	----	----	----	----	----	----	----	----	----

See footnotes at end of table.

TABLE 1.—*Expected average acre yields of principal crops under two levels of management on the soils of Marshall County, Ala.*—Continued

Soil	Field corn		Cotton (lint)		Alfalfa hay		Soybean hay		Sericea hay		Pasture	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Stony smooth land, limestone	---	---	---	---	---	---	---	---	---	---	60	100
Taft silt loam:												
Level phase	30	60	---	---	---	---	0.5	1.0	---	---	90	160
Eroded gently sloping phase	28	50	---	---	---	---	.5	1.0	---	---	85	155
Tellico and Upshur soils:												
Eroded strongly sloping phases	---	---	---	---	---	---	---	---	1.0	2.0	65	130
Eroded moderately steep phases	---	---	---	---	---	---	---	---	---	---	60	110
Steep phases	---	---	---	---	---	---	---	---	---	---	---	---
Tilsit very fine sandy loam:												
Gently sloping phase	45	75	500	800	---	---	1.0	1.5	1.5	2.5	90	160
Eroded gently sloping phase	42	70	475	775	---	---	1.0	1.5	1.5	2.5	85	155
Tupelo silt loam:												
Level phase	25	40	---	---	---	---	.5	1.0	---	---	90	160
Eroded gently sloping phase	30	50	---	---	---	---	.5	1.0	---	---	80	150
Overwash phase	40	80	---	---	---	---	1.0	2.0	---	---	120	180
Tupelo silty clay loam, severely eroded gently sloping phase	---	---	---	---	---	---	---	---	---	---	60	120
Tyler fine sandy loam	30	60	---	---	---	---	1.0	1.5	---	---	90	160
Wolftever silt loam, eroded gently sloping phase	35	65	450	650	---	---	1.0	2.0	---	---	85	155

[1] Cow-acre-days is used to express the carrying capacity of pastureland. It is the number of animal units carried per acre multiplied by the number of days during the year that animals can be grazed without injury to the pasture. For example, a soil type that provides grazing for 1 animal unit per acre for 360 days of the year rates 360; a soil type that provides grazing for 1 animal unit on 2 acres for 180 days rates 90; and a soil type that provides grazing for 1 animal unit on 4 acres for 100 days rates 25.

[2] The cotton yield is considerably reduced when, because of the weather, all the bolls do not open.

[3] In places soil is so cherty that its best use is for pasture, hay, or forest.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils each boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how it differs from others in the profile and to learn the things about the soil that influence its capacity to produce plants.

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and it is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

Structure, which is the way individual soil particles are arranged in larger grains and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying parent material from which the soil has developed; and the acidity or alkalinity of the soil as measured by chemical tests.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified in phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several phases. Types that resemble each other in most of their characteristics are grouped into soil series.

As an example of soil classification, consider the Alcoa series of Marshall County. This series is made up of two soil types, subdivided into phases as follows:

Series	*Type*	*Phase*
Alcoa	Silt loam	Eroded gently sloping phase.
		Eroded sloping phase.
	Silty clay loam	Severely eroded gently sloping phase.
		Severely eroded sloping phase.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil phase.—Because of differences other than those of kind, thickness, and arrangement of layers, some soil

types are divided into two or more phases. Slope variations, frequency of rock outcrop, degree of erosion, depth of the soil over the substratum, and natural drainage are examples of characteristics that suggest dividing a soil type into phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management therefore can be specified more easily for soil phases than for soil series or yet broader groups that contain more variation.

Soil series.—Two or more soil types that differ in surface texture but are otherwise similar in kind, thickness, and arrangement of soil layers are normally designated as a soil series. In a given area, however, a soil series frequently is represented by only one soil type. Each series is named for a place near which it was first mapped.

Miscellaneous land types.—Areas that have little true soil are not classified in types and series but are identified by descriptive names, such as Rockland, sandstone, and Rockland, limestone.

Undifferentiated soil groups.—Two or more similar soils that do not occur in regular geographic association that are mapped as one unit. Allen and Jefferson stony fine sandy loams, strongly sloping phases, is an undifferentiated soil group in Marshall County.

The slope classification used to express the slope ranges of the soils of Marshall County are as follows:

Slope classes	Percent
Level	0 to 2
Gently sloping	2 to 6
Sloping	6 to 10
Strongly sloping	10 to 15
Moderately steep	15 to 25
Steep	25 and over

Five degrees of accelerated erosion are represented by phases of soil types as follows:

Degree of erosion	Frosion phase name
No significant erosion	No phase name used.
From 25 to 75 percent of the original surface layer lost. May have a very few shallow gullies.	Eroded.
From 75 percent to all of the original surface layer lost. May have a few shallow or deep gullies.	Severely eroded.
All of the original layer and as much as 25 percent of the upper subsoil lost. May have a few shallow or deep gullies.	Very severely eroded.
Many moderately deep and deep gullies. Soil profile has been destroyed except for small areas between gullies.	Gullied land.

Soil correlation is the process of assigning uniform names to soils of various areas. This is part of a nationwide system of mapping and classifying soils. The purpose of soil correlation is to show similarities and differences among the soils of each surveyed area and the rest of the United States. To do this the same combination of soil characteristics is given the same name, wherever found.

A more detailed discussion of the methods used in soil surveying can be found in the U. S. Department of Agriculture Soil Survey Manual. Fuller definition of some of the foregoing terms and definitions of unfamiliar terms used in this report can be found in the Glossary.

Description of the Soils

The soils of Marshall County occur on the uplands of the limestone valleys and the sandstone plateaus and in the bottom land on general and local alluvium.

Local alluvium is material that has been moved a short distance by water or gravity and deposited on adjacent lower slopes and along the heads of drainageways. The soils on the colluvial slopes consist partly of local alluvium. They are similar in some respects to the soils of the immediately surrounding upland.

General alluvium is material that has been moved great distances by water and deposited. It commonly consists of mixed rock materials. Some of the alluvium originated in places far from Marshall County.

General alluvium may be young or old. Old alluvium occurs in the form of benches or stream terraces on very old flood plains. This alluvium was deposited by the streams as they cut down to lower levels. The soils on these benches are called soils of the stream terraces. These soils are old enough to have formed well-defined surface and subsoil layers. Their profile is somewhat similar to that of the old soils of the uplands. Young alluvium occurs on first bottoms along streams. The soils developing on this alluvium do not have well-defined surface and subsoil layers. Except where they are protected, these soils are likely to be flooded and thereby receive new deposits of alluvium.

Some areas in the county are stony and some are cherty. The stones and chert interfere with tillage, but generally they do not make it impractical. Tillage normally is not practical on the stony land types. Much of the area consisting of stony soils and stony land types is on mountain slopes. The rest of the soils of the county generally are practically free of stones.

Some of the soils are very friable to moderately firm to a depth of 2 or more feet. In this respect they are suited to most crops. Other soils that are very firm or plastic can be used for tilled crops, but they are not well suited. The drainage of the soils is poor to excessive.

The soils range from nearly level to steep. Some soils have slopes of 60 percent or more. The largest level areas are on Sand Mountain. Other large level areas are on Brindley Mountain, in Paint Rock Valley, in Browns Valley, and in some of the large coves. The level areas on the mountains are ridgetops of various widths. These areas break abruptly to the steep, stony walls of valleys. The first bottoms and lower stream terraces adjacent to the Tennessee River and its larger tributaries are nearly level to gently undulating. The older terraces and chert ridges are undulating to moderately steep. The few shaly ridges are steep. Most of the steep areas are on the long rugged mountain slopes that extend from the high level areas of the sandstone plateaus to the lower level areas of the limestone valleys.

The depth of soil over bedrock ranges from a thin layer in Rockland, limestone, and Rockland, sandstone, to more than 50 feet in some areas of first bottoms, stream terraces, and Fullerton and Clarksville soils. The shallowest soils are generally on the steep mountain slopes. On most of the plateau areas, particularly on Sand Mountain and Brindley Mountain, the soils are 2 to 5 feet deep. The soils on first bottoms, colluvial slopes, and stream terraces generally are deeper over bedrock than those of the up-

lands. The Fullerton and Clarksville soils, however, occur in the uplands and commonly are very deep to bedrock.

Most of the soils of the county are strongly acid. The strongly acid soils include all the soils of the sandstone plateaus and most of the soils of the limestone valleys. The soils on the first bottoms and along drainageways that are slightly acid to neutral are in the Egam, Hollywood, Huntington, Lindside, Melvin, and Newark series. In places the Colbert, Robertsville, and Tupelo soils, and the overwash phase of the Monongahela soils are medium acid to slightly acid.

Many of the soils of the county have a silt loam or silty clay loam surface layer. The surface layer of the soils in the limestone valleys and on the southern parts of the sandstone plateaus is dominantly silt loam or silty clay loam. On the mountain slopes, sandstone plateaus, and stream terraces, many of the soils have a surface layer of sandy loam or sandy clay loam. In a small area on the natural levees along the largest streams of the limestone valleys, the soils have a loamy sand surface layer. The soils that occur over argillaceous, or clayey, limestone in the limestone valleys have a silty clay or clay surface layer.

TABLE 2.—*Characteristics of the*

Soil series	Parent rock	Dominant relief	Drainage class	Depth to bedrock
SOILS OF LIMESTONE				
				Inches
Clarksville	Very cherty dolomitic limestone	Steep	Well drained	24–60+
Colbert	Argillaceous limestone and calcareous shale.	Gently sloping to sloping	Moderately well drained.	24–60
Fullerton	Cherty dolomitic limestone	Strongly sloping to moderately steep.	Well drained	24–60+
Montevallo	Shale	Moderately steep to steep	Excessively well drained.	6–12
Tellico	Mixed shale, sandstone, and limestone	Strongly sloping to steep	Well drained	12–42
Upshur	Argillaceous limestone	Strongly sloping to steep	Moderately well drained.	18–42
SOILS OF SAND				
Albertville	Sandstone and shale	Gently sloping to strongly sloping	Moderately well drained.	11–60
Crossville	Sandstone and sandstone conglomerate	Gently sloping to sloping	Well drained	10–42
Hartsells	Sandstone and shale	Gently sloping to strongly sloping	Well drained	12–48
Linker	Sandstone and sandstone conglomerate	Gently sloping to strongly sloping	Well drained	36–60
Muskingum	Sandstone, sandstone conglomerate, and some shale.	Sloping to moderately steep	Excessively well drained.	1–14
Tilsit	Interbedded sandstone and shale	Nearly level to gently sloping	Moderately well drained.	42–60
SOILS OF				
Alcoa	Shale, and some limestone and sandstone.	Gently sloping to sloping	Well drained	60+
Allen	Sandstone and some shale and limestone.	Gently sloping to moderately steep	Well drained	60+
Hermitage	Limestone, cherty limestone, and some sandstone and shale.	Gently sloping to moderately steep	Well drained	60+
Hollywood	Argillaceous limestone	Level to nearly level	Somewhat poorly drained.	60+
Jefferson	Sandstone and some shale and limestone.	Gently sloping to moderately steep	Well drained	60+
Lobelville	Cherty limestone	Level to nearly level	Moderately well drained to well drained.	60+
Minvale	Cherty dolomitic limestone	Gently sloping to sloping	Well drained	60+

Soil Series and Their Relations

The soils of Marshall County can be divided into five groups according to their topographic positions: (1) Soils of limestone valley uplands; (2) soils of sandstone plateaus; (3) soils of colluvial slopes; (4) soils of stream terraces; and (5) soils of first bottoms.

The soils of the uplands and the soils of the plateaus lie above the bottom lands. They are residual soils that consist of materials derived directly from the underlying rocks. Only a few of the soils of the county are strictly residual because practically all the soils are modified by alluvium or colluvium or are developing from these materials. The soils of colluvial slopes are developing on foot slopes from material that rolled or was washed from higher slopes. The soils of the stream terraces lie on water-laid benchlike areas that border the first bottoms. These soils are higher than the bottoms and are not subject to flooding. The soils of first bottoms are developing near streams from waterborne material. They are likely to be flooded at times.

In table 2, the soil series of the county are placed in 5 groups according to topographic position and the main characteristics of each series are given.

soil series of Marshall County, Ala.

VALLEY UPLANDS

Surface soil		Subsoil			Reaction (pH)
Color	Consistence	Color	Consistence	Texture	
Dark grayish brown to grayish brown.	Very friable	Yellowish brown	Friable	Cherty silty clay loam to silty clay.	4. 5–5. 5
Yellowish brown to grayish brown.	Friable	Yellowish brown to strong brown.	Extremely firm	Clay	4. 5–5. 5
Dark grayish brown to yellowish brown.	Very friable	Yellowish red to red	Friable to firm	Cherty silt loam to cherty silty clay.	4. 5–5. 5
Dark grayish brown to grayish brown.	Very friable	Yellowish brown to brown	Friable	Shaly silt loam	4. 5–5. 5
Reddish brown to dark brown.	Very friable	Reddish brown grading to yellowish red.	Friable	Sandy clay loam to silty clay	4. 5–5. 5
Dark reddish brown	Friable	Dark reddish brown to weak red.	Very firm	Clay	6. 0–7. 5

STONE PLATEAUS

Surface soil		Subsoil			Reaction (pH)
Color	Consistence	Color	Consistence	Texture	
Grayish brown to yellowish brown.	Very friable	Strong brown to yellowish brown.	Friable to firm	Silty clay loam to silty clay	4. 5–5. 5
Dark brown	Very friable	Dark brown to reddish brown.	Friable	Fine sandy loam to fine sandy clay loam.	4. 5–5. 5
Very dark grayish brown to yellowish brown.	Very friable	Yellowish brown to dark yellowish brown.	Friable	Fine sandy loam to sandy clay loam.	4. 5–5. 5
Dark grayish brown to yellowish brown.	Very friable	Yellowish red to red	Friable to firm	Clay loam to sandy clay	4. 5–5. 5
Very dark grayish brown to grayish brown.	Very friable	Yellowish brown	Very friable	Loamy sand to fine sandy loam.	4. 5–5. 5
Grayish brown to black	Very friable	Yellowish brown with mottles.	Friable	Fine sandy loam to sandy clay loam.	4. 5–5. 5

COLLUVIAL SLOPES

Surface soil		Subsoil			Reaction (pH)
Color	Consistence	Color	Consistence	Texture	
Dark brown	Very friable	Dark reddish brown	Friable	Cherty silty clay loam to cherty silty clay.	4. 5–5. 5
Dark grayish brown to dark brown.	Very friable	Yellowish red to dark red	Friable	Fine sandy clay loam to fine sandy clay.	4. 5–5. 5
Brown or brownish gray	Very friable	Reddish brown to red	Firm	Silty clay loam to clay	4. 5–5. 5
Very dark gray to black	Firm to very firm.	Black	Extremely firm	Clay	7. 0–7. 5
Grayish brown to dark grayish brown.	Very friable	Yellowish brown	Friable	Fine sandy clay loam	4. 5–5. 5
Dark brown	Very friable	Brown to yellowish brown	Friable	Cherty silty clay loam	4. 5–5. 5
Very dark grayish brown to grayish brown.	Very friable	Yellowish red to yellowish brown.	Firm	Cherty silty clay loam to cherty silty clay.	4. 5–5. 5

TABLE 2.—*Characteristics of the soil*

SOILS OF

Soil series	Parent rock	Dominant relief	Drainage class	Depth to bedrock
				Inches
Captina	Argillaceous limestone and some sandstone and shale.	Gently sloping	Moderately well drained.	60+
Cumberland	Limestone and some sandstone and shale.	Gently sloping to moderately steep	Well drained	60+
Etowah	Limestone, cherty limestone, and some sandstone and shale.	Nearly level to gently sloping	Well drained to moderately well drained.	60+
Monongahela	Sandstone and some limestone and shale.	Nearly level to gently sloping	Moderately well drained.	60+
Purdy	Sandstone and some limestone and shale.	Level to nearly level	Poorly drained	60+
Robertsville	Limestone and some sandstone and shale.	Level to nearly level	Poorly drained	60+
Taft	Limestone and some sandstone and shale.	Nearly level to gently sloping	Somewhat poorly drained.	60+
Tupelo	Limestone and some sandstone and shale.	Nearly level to gently sloping	Somewhat poorly drained.	60+
Tyler	Sandstone and some limestone and shale.	Nearly level to gently sloping	Somewhat poorly drained.	60+
Waynesboro	Sandstone, shale, and limestone	Gently sloping to moderately steep	Well drained	60+
Wolftever	Limestone and some sandstone and shale.	Nearly level to gently sloping	Moderately well drained.	60+
SOILS OF FIRST BOTTOMS				
Atkins	Sandstone and some shale	Level to nearly level	Poorly drained	60+
Egam	Limestone mainly	Nearly level to gently sloping	Moderately well drained.	60+
Huntington	Limestone and some sandstone and shale.	Level to nearly level	Well drained	60+
Lindside	Limestone mainly	Level to nearly level	Moderately well to somewhat poorly drained.	60+
Melvin	Limestone and some sandstone and shale.	Level to nearly level	Poorly drained	60+
Newark	Limestone and some sandstone and shale.	Level to nearly level	Somewhat poorly drained.	60+
Philo	Sandstone and some shale	Level to nearly level	Moderately well drained.	60+
Pope	Sandstone and some shale	Level to nearly level	Well drained	60+
Sandy alluvial land, excessively drained.	Sandstone	Level to nearly level	Excessively drained	60+
Stendal	Sandstone and some shale	Level to nearly level	Somewhat poorly drained.	60+

Soil Series, Types, and Phases

This subsection is provided for those who want detailed information about the soils of the county. It describes the single soils, or mapping units, in this county; that is, the areas on the detailed soil map that are bounded by lines and identified by a letter symbol. For more general information about soils, the reader can refer to the section, Soil Associations, in which the broad patterns of soils are described.

An important part of this subsection is the series description. The series description includes statements about the general nature of the soils of the series and their relations to the soils of other series. Each series generally has at least one profile description, which is followed by a summary of the range of characteristics of the soils in the series. The series description also includes statements on topography, drainage, and native vegetation.

The descriptions of the individual soils follow the series description. All the soils of one series that have the same texture are together. For example, all Albertville soils that have a silty clay surface soil are together, and then all Albertville soils that have a very fine sandy loam surface soil. Following the name of each soil, or mapping

series of Marshall County, Ala.—Continued

STREAM TERRACES

Surface soil		Subsoil			Reaction (pH)
Color	Consistence	Color	Consistence	Texture	
Dark brown to brown	Very friable	Strong brown to yellowish brown with mottles.	Friable	Silty clay loam to silty clay	4. 5–5. 5
Reddish brown	Very friable	Dark red	Firm	Silty clay loam to clay	4. 5–5. 5
Dark brown to dark reddish brown.	Very friable	Dark reddish brown	Friable	Silty clay loam	4. 5–5. 5
Dark grayish brown to brown.	Very friable	Yellowish brown with mottles.	Friable	Fine sandy clay loam to fine sandy clay.	4. 5–5. 5
Gray to grayish brown	Very friable	Pale brown to light gray with mottles.	Friable	Fine sandy clay loam to clay	4. 5–5. 5
Very dark grayish brown to dark gray.	Friable	Gray with mottles	Extremely firm	Silty clay to clay	5. 0–6. 0
Very dark grayish brown to brown.	Very friable	Yellowish brown with mottles.	Friable	Silty clay loam	4. 5–5. 5
Dark brown	Very friable	Yellowish brown with mottles.	Very firm	Clay	4. 5–5. 5
Dark grayish brown to very dark grayish brown.	Very friable	Grayish brown to yellowish brown with mottles.	Friable	Fine sandy clay loam to fine sandy clay.	4. 5–5. 5
Dark grayish brown to dark brown.	Very friable	Dark red to yellowish red	Friable	Fine sandy clay loam to fine sandy clay.	4. 5–5. 5
Dark brown	Very friable	Dark brown	Friable	Silty clay	4. 5–5. 5

AND LOCAL ALLUVIUM

Light gray to dark gray	Friable	Light gray with mottles	Friable	Fine sandy loam to silty clay loam.	4. 5–5. 5
Dark brown	Friable	Dark brown to very dark brown.	Firm	Silty clay loam to silty clay	5. 5–6. 5
Dark brown	Very friable	Dark brown	Very friable	Loam, silt loam, and fine sandy loam.	6. 0–7. 0
Dark reddish brown to dark grayish brown.	Very friable	Mottled gray, brown, and yellow at about 18 inches.	Firm	Silt loam to silty clay	6. 0–7. 0
Dark gray to dark grayish brown.	Very friable	Gray mottled with yellow and brown from surface down.	Firm	Silty clay loam to silty clay	6. 0–7. 0
Dark grayish brown	Very friable	Dark grayish brown with mottles of gray and strong brown at about 10 inches.	Friable to firm	Fine sandy loam to silty clay loam.	5. 5–6. 5
Very dark grayish brown to yellowish brown.	Very friable	Yellowish brown to light yellow with mottles.	Friable	Fine sandy loam to fine sandy clay loam.	4. 5–5. 5
Dark brown	Very friable	Dark brown	Friable	Fine sandy loam to very fine sandy clay loam.	4. 5–5. 5
Dark brown to yellowish brown.	Very friable	Dark yellowish brown to very pale brown.	Very friable	Loamy sand to sand	4. 5–5. 5
Grayish brown	Very friable	Yellowish brown to gray with mottles.	Friable	Fine sandy loam to fine sandy clay loam.	4. 5–5. 5

unit, are three sets of parentheses. In the first set is the slope range of the soil; in the second is the symbol used to identify the soil on the detailed map; and in the third is the capability unit in which the soil has been placed.

Because most of the characteristics of the soils of a series are discussed in the series description, the individual soils, or mapping units, generally are described only as they differ from the series descriptions. Some of the differences of the mapping unit, or soil, are shown in the name of the mapping unit; other differences must be described. If the mapping unit contains inclusions of other soils, these are named in the description of the mapping unit.

In describing soils, the scientist frequently assigns a letter symbol, for example, "A_1," to the various layers. These letter symbols have a special meaning that concerns scientists and others who desire to make a special study of the soils. Most readers will need to remember only that all letter symbols beginning with "A" are surface soil; those beginning with "B" are subsoil; those beginning with "C" are substratum, or parent material; and those beginning with "D" are underlying rock or material.

The color of a soil can be described in words, such as yellowish brown, or can be stated in much more precise terms by giving symbols for the hue, value, and chroma,

such as 10YR 5/4. Precise symbols of this kind, called Munsell notations, are given along with the descriptive words that tell the color of most of the soil horizons. Unless otherwise stated, the Munsell notations and descriptive words are for moist soils.

The location and distribution of the single soils are shown on the soil map at the back of this report. Their approximate acreage and proportionate extent are given in table 3. It will be helpful to refer to the section, Soil Survey Methods and Definitions, where "series," "types," "phases," and other special terms used in describing soils are defined. The Glossary at the end of the report defines many other special terms.

Albertville series

The Albertville series consists of well-drained soils that were derived from acid interbedded shale and sandstone of the Pottsville formation. These soils are widely distributed on the mountain plateaus on gentle to strong slopes.

Albertville soils are associated with the Hartsells, Tilsit, and Muskingum soils. Their subsoil is browner and more strongly developed than that of the Hartsells and Tilsit soils, and it contains more clay and shale fragments. Unlike the Tilsit soils, these soils have no pan. They have less moisture-supplying capacity than the Hartsells soils; the slower permeability of their subsoil causes more rapid runoff.

The profiles of two soils of the Albertville series are described, one for the soils of normal depth, and one for the shallow soils. The shallow phases of the Albertville series have a depth to parent material of less than 21 inches.

Profile description (Albertville very fine sandy loam, eroded gently sloping phase):

A_p 0 to 7 inches, yellowish-brown (10YR 5/4) very fine sandy loam; medium and coarse granular structure; very friable; strongly acid; gradual boundary.

B_1 7 to 9 inches, yellowish-brown (10YR 5/6) silty clay loam; weak fine subangular blocky structure; friable; strongly acid; abrupt boundary.

B_2 9 to 24 inches, strong-brown (7.5YR 5/6) silty clay with few, medium, faint mottles of dark brown (7.5YR 4/4); moderate to weak medium subangular blocky structure; friable; strongly acid; gradual boundary.

B_3 24 to 35 inches, strong-brown (7.5YR 5/8) silty clay with many, medium, distinct mottles of brownish yellow (10YR 6/6), very pale brown (10YR 7/3), dark brown (7.5YR 4/4), and yellowish red (5YR 5/8); weak moderate fine and medium angular and subangular blocky structure; friable; strongly acid; gradual boundary.

C 35 inches+, yellowish-brown (10YR 5/8) silty clay with many, coarse, prominent mottles of strong brown (7.5YR 5/8), light yellowish brown (10YR 6/4), and dark red (2.5YR 3/6); weak fine and medium angular and subangular blocky structure; friable; strongly acid.

Range in characteristics: Under native forest there is an A_1 layer of dark-gray (10YR 4/1) to grayish-brown (10YR 5/2) very fine sandy loam about 1 inch thick. The A_2 layer in places is brown (10YR 5/3). The texture of the A horizon ranges from very fine sandy loam to fine sandy loam. In those parts transitional to Hartsells soils, the texture of the surface soil is fine sandy loam and the subsoil is more sandy than typical. The depth to parent material ranges from about 10 to about 40 inches. In some virgin areas, the B_1 layer is as much as 7 inches thick. The B_2 layer ranges from about 6 to 20 inches in thickness and, in places, is yellowish brown (10YR 5/6) to red (2.5YR 4/8). The B_3 layer ranges from about 4 to 12 inches in thickness. Small pockets of sand are common in the B_3 layer. Small, rounded, dark reddish-brown pebbles of sandstone are common on the surface in most places.

Topography: Predominantly undulating to rolling upland; a small acreage on hilly upland. Slopes range from 2 to 15 percent.

Drainage: Permeability is moderately slow to slow. Internal drainage is medium. Surface runoff is medium to rapid.

Native vegetation: Mixed deciduous and pine forest.

Profile description (Albertville silty clay, severely eroded sloping shallow phase):

B_p 0 to 7 inches, yellowish-brown (10YR 5/6) silty clay.

B_3 7 to 11 inches, strong-brown (7.5YR 5/6) silty clay with common yellowish-red and yellow mottles; variable amount of partly weathered shale and sandstone intermixed.

C 11 inches+, strong-brown (7.5YR 5/8) silty clay with many yellow and dark-brown mottles; friable to firm; many partly weathered shale and sandstone fragments.

Albertville very fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (AcB2) (Capability unit IIe–3).—This is the most extensive Albertville soil. Practically all has been cleared, and most of it is now used for cotton and corn. It is suited to most crops commonly grown, but its capability is somewhat limited by the clayey subsoil, the shallow root zone, the low fertility, and the low content of organic matter.

Albertville very fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (AcC2) (Capability unit IIIe–3).—This soil is less suitable for crops than Albertville very fine sandy loam, eroded gently sloping phase, because it is more strongly sloping and is 6 to 10 inches shallower.

Albertville silty clay, severely eroded gently sloping phase (2 to 6 percent slopes) (AaB3) (Capability unit IIIe–3).—This soil has a 15- to 17-inch surface layer of yellowish-brown to strong-brown silty clay that is underlain by material similar to that in the B_3 and C layers of Albertville very fine sandy loam, eroded gently sloping phase. Most areas are small and are closely associated with Albertville very fine sandy loam, eroded gently sloping phase. Because of the clayey surface layer, this soil has lower water-holding capacity, more rapid runoff, and poorer tilth than the eroded gently sloping phase of Albertville very fine sandy loam. Included are small areas that still retain much of the original surface soil. These inclusions have a plow layer of yellowish-brown very fine sandy loam or clay loam.

Albertville silty clay, severely eroded sloping phase (6 to 10 percent slopes) (AaC3) (Capability unit IVe–3).—The 12- to 14-inch surface layer of this soil is yellowish-brown to strong-brown silty clay. The underlying layers are similar to the B_3 and C layers of Albertville very fine sandy loam, eroded gently sloping phase. Most areas of this inextensive soil are small and closely associated with the eroded gently sloping and eroded sloping phases of Albertville very fine sandy loam. Because of the clayey surface soil, fairly rapid runoff, low water-holding capacity, and poor tilth, this soil is not well suited to crops. Included in this mapping unit are about 5 acres on Merrill Mountain that have a fragipan at a depth of about 15 inches.

Albertville silty clay, severely eroded sloping shallow phase (6 to 10 percent slopes) (AbC3) (Capability unit VIe–1).—This soil has the second profile described for the

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Marshall County, Alabama*

Soil	Acres	Percent
Albertville very fine sandy loam:		
Eroded gently sloping phase AcB2	16, 653	4. 5
Eroded sloping phase AcC2	3, 331	. 9
Albertville silty clay:		
Severely eroded gently sloping phase AaB3	1, 110	. 3
Severely eroded sloping phase AaC3	777	. 2
Severely eroded sloping shallow phase AbC3	444	. 1
Severely eroded strongly sloping shallow phase AbD3	444	. 1
Alcoa silt loam:		
Eroded gently sloping phase AdB2	555	. 2
Eroded sloping phase AdC2	222	. 1
Alcoa silty clay loam:		
Severely eroded gently sloping phase AeB3	333	. 1
Severely eroded sloping phase AeC3	333	. 1
Allen and Jefferson stony fine sandy loams:		
Strongly sloping phases AfD	666	. 2
Moderately steep phases AfE	666	. 2
Allen-Waynesboro fine sandy loams:		
Eroded gently sloping phases AhB2	5, 690	1. 5
Eroded sloping phases AhC2	777	. 2
Strongly sloping phases AhD	555	. 2
Moderately steep phases AhE	1, 332	. 4
Allen-Waynesboro fine sandy clay loams:		
Severely eroded gently sloping phases AgB3	2, 220	. 6
Severely eroded sloping phases AgC3	3, 331	. 9
Severely eroded strongly sloping phases AgD3	333	. 1
Atkins soils Ak	333	. 1
Captina silt loam, eroded gently sloping phase CaB2	5, 718	1. 5
Captina silty clay loam, severely eroded gently sloping phase CbB3	222	. 1
Captina-Colbert soils, gently sloping phases CcB	333	. 1
Colbert silty clay loam:		
Eroded gently sloping phase CeB2	611	. 2
Overwash phase Cf	222	. 1
Colbert silty clay:		
Severely eroded gently sloping phase CdB3	1, 221	. 3
Severely eroded sloping phase CdC3	1, 582	. 4
Crossville loam:		
Eroded gently sloping phase CkB2	777	. 2
Eroded sloping phase CkC2	777	. 2
Crossville fine sandy loam:		
Eroded gently sloping moderately deep phase CgB2	5, 662	1. 5
Eroded sloping moderately deep phase CgC2	2, 248	. 6
Crossville fine sandy clay loam, severely eroded sloping moderately deep phase ChC3	555	. 2
Cumberland and Hermitage silt loams:		
Eroded gently sloping phases CmB2	777	. 2
Eroded sloping phases CmC2	222	. 1
Cumberland and Hermitage silty clay loams:		
Severely eroded gently sloping phases CnB3	2, 220	. 6
Severely eroded sloping phases CnC3	2, 220	. 6
Severely eroded strongly sloping phases CnD3	389	. 1
Severely eroded moderately steep phases CnE3	139	(1)
Egam silty clay loam Ea	1, 443	. 4
Sandy substratum phase Eb	1, 110	. 3
Egam-Newark silty clay loams Ec	4, 663	1. 3
Etowah loam, eroded gently sloping phase EdB2	305	. 1
Fullerton cherty silt loam:		
Strongly sloping phase FaD	555	. 2
Eroded strongly sloping phase FaD2	333	. 1
Moderately steep phase FaE	1, 887	. 5
Eroded moderately steep phase FaE2	777	. 2
Fullerton cherty silty clay loam, severely eroded strongly sloping phase FbD3	333	. 1
Fullerton-Clarksville cherty silt loams, steep phases FcF	13, 100	3. 6
Gullied land Ga	494	. 1
Hartsells fine sandy loam:		
Gently sloping phase HaB	555	. 2
Eroded gently sloping phase HaB2 75,347	~~77, 747~~	21. 2
Sloping phase HaC	222	. 1
Eroded sloping phase HaC2	13, 322	3. 6
Eroded gently sloping shallow phase HbB2	555	. 2
Eroded sloping shallow phase HbC2	22, 204	6. 1
Eroded strongly sloping shallow phase HbD2	5, 551	1. 5
Hartsells fine sandy clay loam:		
Severely eroded sloping phase HcC3	555	0. 2
Severely eroded gently sloping shallow phase HdB3	222	. 1
Hollywood clay He	56	(1)
Huntington silt loam Hh	56	(1)
Local alluvium phase Hk	472	. 1
Huntington fine sandy loam Hf	2, 109	. 6
Huntington loam, local alluvium phase Hg	555	. 2
Jefferson fine sandy loam:		
Eroded gently sloping phase JaB2	622	. 2
Eroded sloping phase JaC2	455	. 1
Moderately steep phase JaE	688	. 2
Lindside silt loam, local alluvium phase La	777	. 2
Linker fine sandy loam:		
Eroded gently sloping phase LbB2	6, 717	1. 8
Eroded sloping phase LbC2	666	. 2
Eroded strongly sloping phase LbD2	139	(1)
Linker fine sandy clay loam:		
Severely eroded gently sloping phase LcB3	7, 771	2. 1
Severely eroded sloping phase LcC3	7, 771	2. 1
Severely eroded strongly sloping phase LcD3	333	. 1
Lobelville cherty silt loam, local alluvium phase Ld	555	. 2
Melvin silt loam and silty clay loam Mb	888	. 2
Melvin fine sandy loam Ma	222	. 1
Minvale cherty silt loam:		
Gently sloping phase McB	555	. 2
Eroded gently sloping phase McB2	5, 551	1. 5
Sloping phase McC	4, 441	1. 2
Eroded sloping phase McC2	2, 398	. 6
Minvale cherty silty clay loam:		
Severely eroded gently sloping phase MdB3	5, 551	1. 5
Severely eroded sloping phase MdC3	4, 441	1. 2
Monongahela fine sandy loam:		
Eroded gently sloping phase MeB2	611	. 2
Overwash phase Mf	555	. 2
Montevallo shaly silt loam, severely eroded steep phase MgF3	466	. 1
Muskingum fine sandy loam:		
Eroded sloping phase MhC2	500	. 1
Eroded strongly sloping phase MhD2	805	. 2
Eroded moderately steep phase MhE2	1, 110	. 3
Muskingum stony fine sandy loam, strongly sloping phase MkD	555	. 2
Newark fine sandy loam Na	2, 220	. 6
Newark loam, local alluvium phase Nb	555	. 2
Philo and Stendal soils, local alluvium phases Pa	2, 470	. 7
Pope fine sandy loam Pb	111	(1)
Purdy fine sandy loam Pc	111	(1)
Robertsville silty clay loam Ra	555	. 2
Rockland:		
Limestone Rb	14, 460	3. 9
Sandstone Rc	19, 540	5. 3
Sandy alluvial land, excessively drained Sa	56	(1)
Stony colluvial land, Allen soil material Sb	33, 306	9. 1
Stony smooth land, limestone Sc	333	. 1
Taft silt loam:		
Level phase TaA	361	. 1
Eroded gently sloping phase TaB2	2, 220	. 6
Tellico and Upshur soils:		
Eroded strongly sloping phases TbD2	333	. 1
Eroded moderately steep phases TbE2	555	. 2
Steep phases TbF	4, 441	1. 2
Tilsit very fine sandy loam:		
Gently sloping phase TcB	555	. 2
Eroded gently sloping phase TcB2	11, 102	3. 0
Tupelo silt loam:		
Level phase TdA	333	. 1
Eroded gently sloping phase TdB2	555	. 2
Overwash phase Te	611	. 2
Tupelo silty clay loam, severely eroded gently sloping phase TfB3	111	(1)
Tyler fine sandy loam Tg	111	(1)
Wolftever silt loam, eroded gently sloping phase WaB2	111	(1)
Total	365, 440	100. 0
WC Water 35,710	35, 840	

1 Less than 0.1 percent.

series. Because of the clayey surface soil, very shallow depth, and strong slope, this soil is poorly suited to crops. Included are about 100 acres that have slopes of less than 6 percent.

Albertville silty clay, severely eroded strongly sloping shallow phase (10 to 15 percent slopes) (AbD3) (Capability unit VIIe–1).—Because of the clayey surface layer, shallow depth to bedrock, and strong slope, this soil is poorly suited to either crops or pasture. Included is about 100 acres that has a depth to parent material exceeding 21 inches. About half of this inclusion is moderately eroded; the rest is severely eroded. The moderately eroded areas have a surface layer of yellowish-brown fine sandy loam. The severely eroded areas have a surface layer of silty clay.

Alcoa series

The Alcoa series consists of soils on old colluvium that are deep and well drained. These soils have developed in the limestone valleys from material that was derived mainly from shale but partly from sandstone and limestone. Alcoa soils occur on the lower slopes, mainly on the western side of Dividing Ridge. These soils are subject to very severe erosion. They are low in natural plant nutrients but respond readily to fertilizer. They generally have high water-holding capacity, but the severely eroded areas do not hold moisture well.

Alcoa soils are associated mainly with the Tellico and Upshur soils, from which their parent material fell or was washed. They are deeper than the Tellico soils. They are undulating to rolling, whereas the Tellico and Upshur soils are hilly to steep. Alcoa soils are coarser in texture than the Upshur soils, which were derived from limestone. In places the Alcoa soils are associated with the Minvale soils. They are browner than the Minvale soils and do not contain chert.

Typical profile (Alcoa silt loam, eroded gently sloping phase):

AB_p 0 to 5 inches, dark-brown (7.5YR 3/2) silt loam; weak medium granular structure; very friable; strongly acid; 4 to 7 inches thick; abrupt boundary.

B_1 5 to 12 inches, dark reddish-brown (5YR 3/3) silty clay loam; weak coarse granular and weak fine subangular blocky structure; strongly acid; 2 to 10 inches thick; gradual boundary.

B_2 12 to 42 inches +, dark reddish-brown (5YR 3/3) silty clay loam to silty clay; moderate medium subangular blocky structure; friable; very strongly acid; many feet thick.

Range in characteristics: Some areas have small, soft, platy fragments of shale on the surface. In places the B_2 layer is reddish-brown (5YR 4/3 to 5YR 4/4) firm silty clay. Where these soils border Captina or Colbert soils, the lower subsoil is lighter in color than typical.

Topography: Gently sloping to sloping.

Drainage: Surface runoff is moderate to rapid. Permeability is moderate, and internal drainage is medium.

Native vegetation: Shortleaf pine, loblolly pine, white oak, red oak, hickory, and some cedar.

Alcoa silt loam, eroded gently sloping phase (2 to 6 percent slopes) (AdB2) (Capability unit IIe–1).—This is the most extensive Alcoa soil. It is well suited to the crops commonly grown in the area.

Alcoa silt loam, eroded sloping phase (6 to 10 percent slopes) (AdC2) (Capability unit IIIe–1).—This soil is generally 4 to 8 inches shallower than Alcoa silt loam, eroded gently sloping phase, and it needs more exacting management.

Alcoa silty clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (AeB3) (Capability unit IIIe–1).—Because this soil has a finer textured surface layer, more rapid runoff, less water-holding capacity, and poorer tilth than Alcoa silt loam, eroded gently sloping phase, it is less suitable for row crops. It is better suited to pasture and hay than to row crops.

Alcoa silty clay loam, severely eroded sloping phase (6 to 10 percent slopes) (AeC3) (Capability unit IVe–3).—This soil has a dark reddish-brown plow layer. It is shallower to parent material than Alcoa silt loam, eroded gently sloping phase, and has poorer tilth, less water-holding capacity, and more rapid runoff. It is better suited to hay and pasture than to row crops.

Allen and Jefferson series

The Allen and Jefferson soils are mapped together because they are similar and occupy only small acreages. These deep well-drained soils occur on old colluvium on foot slopes at the base of steep mountain slopes. They lie directly below areas of Muskingum soils and Rockland, sandstone. The parent rock of the colluvium was sandstone, cherty limestone, and some shale. Large stones and boulders are on the surface and throughout the profile of these soils. The subsoil of the Allen soils is reddish, whereas that of the Jefferson soils is yellowish brown. These soils are acid and low in plant nutrients. They are permeable and have a moderate water-holding capacity.

Profile in an undisturbed area (Allen stony fine sandy loam):

A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) stony fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 1 to 4 inches thick; abrupt wavy boundary.

A_2 2 to 9 inches, brown (10YR 5/3) to grayish-brown (10YR 5/2) stony fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 4 to 10 inches thick; gradual wavy boundary.

B_1 9 to 15 inches, yellowish-red (5YR 4/6) to reddish-brown (5YR 4/4) fine sandy clay loam; weak medium and fine subangular blocky structure; friable; strongly acid; 2 to 12 inches thick; gradual wavy boundary.

B_2 15 to 48 inches+, dark-red (2.5YR 3/6) fine sandy clay loam; moderate medium subangular blocky structure; friable; very strongly acid; many feet thick.

Profile in undisturbed area (Jefferson stony fine sandy loam):

0 to 2 inches, dark grayish-brown (10YR 4/2) stony fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 1 to 4 inches thick; abrupt wavy boundary.

2 to 10 inches, grayish-brown (10YR 5/2) stony fine sandy loam; weak and medium granular structure; very friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

10 to 48 inches+, yellowish-brown (10YR 5/4 to 10YR 5/6) fine sandy loam to fine sandy clay loam; weak fine and medium subangular blocky structure; friable; strongly acid; many feet deep.

Range in characteristics: The amount and size of the stones and boulders vary greatly. In places the color of the surface soil is very dark grayish brown.

Topography: Rolling, hilly, and moderately steep.

Drainage: Surface runoff is medium except on the steep slopes, where it is moderately rapid. Permeability is moderate, and internal drainage is medium.

Native vegetation: Red, white, black, and post oaks, hickory, dogwood, shortleaf pine, and loblolly pine.

Allen and Jefferson stony fine sandy loams, strongly sloping phases (10 to 15 percent slopes) (AfD) (Capability unit VIe–4).—In this mapping unit are areas that have slopes of 6 to 10 percent and areas that are eroded. The eroded areas have a 6- to 7-inch surface layer that is grayish brown to yellowish brown. The surface soil in eroded areas contains less organic matter than the surface soil elsewhere. Some of the less sloping tracts can be used for pasture, but the best use for these soils probably is forest.

Allen and Jefferson stony fine sandy loams, moderately steep phases (15 to 25 percent slopes) (AfE) (Capability unit VIIe–2).—Because they are stony, low in fertility, and steep, these soils are best suited to forest. Included are some eroded areas that have a 6- to 8-inch grayish-brown to yellowish-brown surface layer. The surface layer of these inclusions contains less organic matter than the surface layer elsewhere.

Allen-Waynesboro soils

Allen soils and Waynesboro soils are mapped together because, except for their origin and their position in the landscape, they are similar. The parent material of Allen soils consists of old local alluvium on the foot slopes below the steep sides of mountains. The Waynesboro soils have developed from old general alluvium that was deposited by large streams on high terraces.

The Allen-Waynesboro soils are gently sloping to moderately steep. They are widely distributed throughout the county and are the dominant soils of the limestone valleys. They are associated mainly with Jefferson, Cumberland, Hermitage, and Minvale soils. They have a lighter red and coarser textured subsoil than the Cumberland and Hermitage soils. These soils are better drained than the Monongahela soils and are not so fine textured or cherty as the Minvale soils.

These soils generally have a very friable, strongly acid, dark-brown, (7.5YR 3/2) to dark reddish-brown (5YR 3/3) surface layer, 4 to 7 inches thick. The structure is weak fine and medium granular. The B_1 layer is friable, strongly acid, reddish-brown (5YR 4/4) to yellowish-red (5YR 4/6) fine sandy clay loam, 2 to 12 inches thick. Its structure ranges from weak medium to fine subangular blocky. The B_2 layer is friable, very strongly acid, dark-red (2.5YR 3/6) fine sandy clay loam to clay loam that is many feet thick. This layer has a moderate medium subangular blocky structure.

In some wooded areas, the surface soil is very dark grayish brown (10YR 3/2) to grayish brown (10YR 5/2). In many places pieces of quartz occur on the surface and in the substratum. In some places there are loose fragments of sandstone and chert on the surface and in the substratum. These soils are slightly plastic when wet and firm when moist where they occur on colluvium that contains more material derived from limestone than is normal.

These soils have rapid runoff on the steep more severely eroded areas and medium runoff on the undulating moderately eroded areas. Permeability is moderate, and internal drainage is medium. The moisture-holding capacity is high, except where the soils are severely eroded.

Much of the acreage is used for cotton and corn, and some is in pasture and forest. The undulating and rolling areas are well suited to cotton and corn, but the stronger slopes are better suited to sericea lespedeza or other pasture plants.

Allen-Waynesboro fine sandy loams, eroded gently sloping phases (2 to 6 percent slopes) (AhB2) (Capability unit IIe–3).—These are the most extensive of the Allen-Waynesboro soils in the county. They are very suitable for crops. Some slightly eroded areas are included that have a dark grayish-brown surface layer, 8 to 10 inches thick. Also included on the low stream terraces are areas having a brown to dark-brown, 6- to 10-inch fine sandy loam surface soil and a dark reddish-brown fine sandy clay loam subsoil ranging from 25 to 40 inches in thickness.

Allen-Waynesboro fine sandy loams, eroded sloping phases (6 to 10 percent slopes) (AhC2) (Capability unit IIIe–3).—Because of the stronger slope and more rapid runoff, this mapping unit needs more intensive management than Allen-Waynesboro fine sandy loams, eroded gently sloping phases. Included are areas that are only slightly eroded. These inclusions have a very dark grayish-brown surface soil that contains more organic matter than elsewhere.

Allen-Waynesboro fine sandy loams, strongly sloping phases (10 to 15 percent slopes) (AhD) (Capability unit IVe–3).—Because of the strong slopes, rapid runoff, and erosion hazard, these soils are best suited to pasture and hay crops. If row crops are to be grown, they should be grown only once in a 4- to 6-year rotation. Included are areas that have an 8- to 10-inch surface layer that is very dark grayish brown and high in organic matter.

Allen-Waynesboro fine sandy loams, moderately steep phases (15 to 25 percent slopes) (AhE) (Capability unit VIe–1).—These soils have a very dark grayish-brown surface layer and a fairly high content of organic matter. Their B_1 and B_2 horizons are generally 2 to 4 inches thinner than those described for Allen-Waynesboro soils. Because of the steep slopes and generally shallow depth, these soils are best suited for permanent pasture, hay, and forest.

Included with these soils are areas having a 6-inch surface layer of dark-brown to dark reddish-brown fine sandy loam, as well as small severely eroded areas having a surface layer of yellowish-red to dark-red fine sandy clay loam.

Allen-Waynesboro fine sandy clay loams, severely eroded gently sloping phases (2 to 6 percent slopes) (AgB3) (Capability unit IIIe–3).—These soils have a yellowish-red to dark-red plow layer that generally consists of a mixture of remnants of the original surface soil and the upper part of the subsoil. They are associated with Allen-Waynesboro fine sandy loams, eroded gently sloping phases, but have more rapid runoff, less water-holding capacity, and generally poorer tilth.

Allen-Waynesboro fine sandy clay loams, severely eroded sloping phases (6 to 10 percent slopes) (AgC3) (Capability unit IIIe–3).—These soils have a 5- to 6-inch yellowish-red to dark-red plow layer. Because of their stronger slopes, more rapid runoff, and poorer tilth, they are less suitable for crops than Allen-Waynesboro fine sandy loams, eroded gently sloping phases, and need more intensive management. They are best suited to small grains, grasses, and clover for pasture and hay, and other close-growing crops.

Allen-Waynesboro fine sandy clay loams, severely eroded strongly sloping phases (10 to 15 percent slopes) (AgD3) (Capability unit VIe–1).—This inextensive mapping unit

has a yellowish-red to dark-red surface layer. Because of its strong slopes, clayey surface soil, and generally poor tilth, it is not suited to crops. Its best use is permanent hay or pasture.

Atkins series

The Atkins series consists of poorly drained, friable soils on general alluvium and local alluvium. These soils occur on the plateaus and in the valleys. The alluvial parent material has washed mostly from soils derived from acid shale and sandstone—the Hartsells, Linker, Albertville, Tilsit, Crossville, and Muskingum soils on the plateaus, and the Allen, Waynesboro, and Jefferson soils in the valleys. Atkins soils on the plateaus generally occupy many narrow, long strips along drainageways. In the valleys they occupy flats adjacent to the backwaters. The areas in the valleys are likely to be flooded at times. Most of the areas on the plateaus have a high water table. Although they are not subject to flooding, water may stand on them for long periods. These soils have a high water-holding capacity.

Atkins soils are associated with the well drained Pope, the moderately well drained Philo, and the somewhat poorly drained Stendal soils. They are similar to the Melvin soils in drainage but are coarser textured, less fertile, and more acid.

Profile description in a disturbed area (Atkins silt loam):

0 to 8 inches, light-gray (10YR 7/2) silt loam with common, medium, distinct mottles of yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6); weak medium granular structure; friable; 6 to 18 inches thick; strongly acid; gradual wavy boundary.

8 to 42 inches, light-gray (10YR 7/2) silty clay loam with many, coarse, prominent mottles of gray (10YR 6/1), light yellowish brown (10YR 6/4), and brownish yellow (10YR 6/8); weak coarse to medium subangular blocky structure; friable; some iron concretions, especially in lower part; strongly acid; 12 to 36 inches thick; abrupt wavy boundary.

42 inches+, light-gray (10YR 7/1) fine sandy clay loam to fine sandy loam with many, coarse, prominent mottles of gray (10YR 6/1), light yellowish brown (10YR 6/4), and brownish yellow (10YR 6/8); weak medium subangular blocky structure; friable; some iron concretions; strongly acid.

Range in characteristics: The layers under the surface soil range from light fine sandy loam to silty clay loam. These layers are very dark gray (10YR 3/1) to dark gray (10YR 4/1) where the content of organic matter is high. They are white (10YR 8/2) where there is little organic matter. In places strata of sand or coarse sand occur at varying depths.

Topography: Level to nearly level.

Drainage: Surface runoff is slow. Permeability and internal drainage are slow.

Native vegetation: Post oak, willow oak, willow, blackgum, and poplar.

Atkins soils (0 to 2 percent slopes) (Ak) (Capability unit IVw-3).—These soils have a surface layer that ranges from silt loam to light fine sandy loam and includes areas of loamy sand several inches thick.

Captina series

The Captina series consists of moderately well drained soils that have a fragipan. They occur in gently undulating areas on terraces in the limestone valleys. They are the dominant soils in the lower lying, undulating areas north of the Tennessee River near Claysville. These soils were derived mainly from limestone material that had an admixture of sandstone and shale. They are low in fertility. Because of the fragipan, their water-holding capacity is limited.

Captina soils are closely associated with the Taft, Tupelo, Colbert, Cumberland, and Hermitage soils. In places they are mapped with Colbert soils as a complex. They are better drained than the Taft soils and normally deeper to the fragipan. These soils are better drained and coarser textured than the Tupelo soils. They are coarser textured and deeper than the Colbert soils. They are coarser textured than the Cumberland and Hermitage soils but are not so well drained.

Profile description (Captina silt loam, eroded gently sloping phase):

A_p 0 to 6 inches, dark-brown (10YR 4/3) silt loam; weak coarse granular structure; much black concretionary material; very friable; strongly acid; 4 to 7 inches thick; gradual wavy boundary.

B_1 6 to 11 inches, yellowish-brown (10YR 5/4) silty clay loam with common, medium, faint mottles of dark brown (10YR 4/3); weak fine and medium subangular blocky structure; much black concretionary material; friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

B_2 11 to 18 inches, yellowish-brown (10YR 5/6) silty clay loam with many, medium, faint and distinct mottles of black (10YR 2/1) and dark brown (10YR 4/3); moderate medium subangular blocky structure; much black concretionary material; friable; strongly acid; 4 to 20 inches thick; gradual wavy boundary.

B_{3m} 18 to 40 inches+, yellow (10YR 7/6) silty clay loam fragipan with many, coarse, prominent mottles of very pale brown (10YR 7/3), black (10YR 2/1), and strong brown (7.5YR 5/6); many black concretions; moderate medium and fine subangular blocky structure; friable; very strongly acid; many feet thick.

Range in characteristics: The surface layer generally is brown (10YR 5/3) on the nearly level areas. Several small areas north of Guntersville have a 1- or 2-inch mantle of loam over the silt loam surface layer. The more strongly sloping areas have a strong-brown (7.5YR 5/6) to reddish-yellow (5YR 6/8) subsoil. In places the subsoil above the pan is silty clay. In some areas adjoining the bottom lands of the Tennessee River, mica flakes are common in the subsoil. In places a chert layer is in the pan. In the vicinity of Five Points this chert layer is discontinuous and near the top of the pan.

Topography: Gently sloping.

Drainage: Surface runoff is medium on the more nearly level areas and moderately rapid on more sloping areas. Permeability and internal drainage are moderately slow to slow.

Native vegetation: Dominantly white, black, chestnut, and red oaks, hickory, with other deciduous trees.

Captina silt loam, eroded gently sloping phase (2 to 6 percent slopes) (CaB2) (Capability unit IIe-4).—This is the most extensive Captina soil. Because of the gentle slopes and moderately thick silt loam surface soil, it is well suited to crops. The fragipan, however, limits its moisture-holding capacity, and the soil needs good management to maintain an adequate supply of moisture.

Included are a few areas that are not materially eroded. These inclusions have a 10-inch surface layer of dark grayish-brown silt loam. In places where no pan occurs, a subsoil of strong-brown to yellowish-brown heavy silty clay is underlain by distinctly mottled silty clay.

Captina silty clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (CbB3) (Capability unit IIIe-4).—This inextensive soil is associated with Captina silt loam, eroded gently sloping phase. It has a yellowish-

brown to strong-brown silty clay loam surface soil. Because of the clayey surface soil and the shallow depth to bedrock, this soil has lower water-holding capacity than Captina silt loam, eroded gently sloping phase. This soil is better suited to pasture and hay than to row crops.

Captina-Colbert soils

The Captina soils and the Colbert soils are mapped together because they are in areas too small to be shown separately on a map of the scale used. These inextensive soils occur chiefly in Browns Valley. Generally the layer of alluvium in which the Captina soils are forming is on the higher more nearly level areas, whereas the Colbert soils are on the sloping areas. These soils are associated mainly with the Tupelo and Etowah soils and with other Colbert soils.

Captina-Colbert soils, gently sloping phases (2 to 5 percent slopes) (CcB) (Capability unit IIe–4).—The Captina parts of this mapping unit have a layer of alluvium, 20 to 36 inches thick. The profile in these areas is similar to that described for the Captina series. The Colbert parts have no thick layer of alluvium. The Captina-Colbert soils are strongly acid. They are moderate to low in fertility. The Captina parts of the mapping unit have a moderate water-holding capacity; the Colbert parts have a low water-holding capacity. Internal drainage is somewhat poor to moderately good. Permeability is slow to very slow in the Colbert soil and moderately slow in the Captina soil.

About half of this mapping unit is moderately eroded. Most of the rest has a surface soil that is thicker than that described for either the Colbert or the Captina soils. In a few patches the subsoil of silty clay loam or silty clay has been exposed through severe erosion. In a few places the upper 12 to 18 inches of alluvium is reddish. The 5-inch surface soil is dark-brown to dark reddish-brown silt loam. It is underlain by 5 to 7 inches of dark reddish-brown silty clay loam. Practically all of this mapping unit is used for crops. The chief crops are corn and hay, and there is some cotton. Slow drainage, poor workability, and low water-holding capacity limit the use of this mapping unit.

Colbert series

The Colbert series consists of moderately well drained upland soils that were derived from argillaceous limestone and calcareous shale in the limestone valleys. These soils have a subsoil of heavy, plastic silty clay or clay. They contain little organic matter. Rock outcrops are common. If runoff is not controlled, erosion is severe or very severe. These soils are associated with Tupelo soils and with Rockland, limestone. They are better drained than the Tupelo soils.

Typical profile (Colbert silty clay loam, eroded gently sloping phase):

A_p 0 to 5 inches, grayish-brown (10YR 3/2) silty clay loam; weak coarse granular structure; much rounded, black concretionary material; friable; slightly to strongly acid; 4 to 6 inches thick; abrupt wavy boundary.

B_2 5 to 40 inches, yellowish-brown (10YR 5/4 to 10YR 5/6) clay; many, fine and medium, faint and distinct mottles of light brownish gray (10YR 6/2), gray (10YR 6/1), and strong brown (7.5YR 5/6); structureless (massive); many tiny black concretions; extremely firm when moist, very hard when dry, and very sticky and very plastic when wet; slightly to strongly acid; 2 to 40 inches thick; abrupt wavy boundary.

D 40 inches+, limestone bedrock.

Range in characteristics: The surface layer ranges in color from dark brown (10YR 3/3) to dark yellowish brown (10YR 4/4). In some places chert fragments occur on the surface and in the A_p horizon. The depth to bedrock varies greatly within short distances. In a few places the subsoil is strong brown (7.5YR 5/6) to yellowish red (5YR 4/6). Normally the areas adjacent to limestone outcrops are slightly acid; other areas are mostly strongly acid. Both moderately eroded and severely eroded spots are common.

Topography: Gently sloping to sloping.

Drainage: Surface runoff is rapid. Permeability and internal drainage are slow to very slow.

Native vegetation: Cedar trees are dominant, and there are some hickory, white oak, red oak, black oak, and other hardwoods.

Colbert silty clay loam, eroded gently sloping phase (2 to 6 percent slopes) (CeB2) (Capability unit IIIe–4).—This soil has poor tilth and very slow permeability. The range of moisture content at which it can be cultivated is very narrow. It needs very exacting management and is better suited to pasture and hay crops than to row crops. Included with this soil are areas that have a dark-brown surface soil and a yellowish-red to red silty clay subsoil that is somewhat mottled with light yellowish brown.

Colbert silty clay loam, overwash phase (0 to 2 percent slopes) (Cf) (Capability unit IIIw–1).—This soil lies on level to nearly level colluvium next to the gently sloping and sloping phases of Colbert soils. It has a dark grayish-brown silty clay loam surface layer that is mottled with brown and contains many small, black concretions. This layer is 12 to 18 inches thick and overlies yellowish-brown silty clay loam mottled with brown. The silty clay loam is transitional to massive plastic silty clay that overlies very plastic clay, which is more intensely mottled than the upper subsoil. This soil is strongly acid except in areas near Rockland, limestone, where it is slightly acid. Because of its clayey surface layer, this soil has impaired drainage, poor tilth, and poor workability. It is better suited to grasses and legumes for pasture and hay than to row crops.

Colbert silty clay, severely eroded gently sloping phase (2 to 6 percent slopes) (CdB3) (Capability unit IVe–1).—This soil differs from Colbert silty clay loam, eroded gently sloping phase, in having a surface layer of plastic light yellowish-brown heavy silty clay. It is very poorly suited to row crops. Under good management it can be used for grasses and legumes. Included with this soil are a few areas that have a surface soil and upper subsoil of yellowish-red to red plastic silty clay. The subsoil is mottled below a shallow depth.

Colbert silty clay, severely eroded sloping phase (6 to 10 percent slopes) (CdC3) (Capability unit VIe–4).—This soil normally is shallower to bedrock than Colbert silty clay, severely eroded gently sloping phase. It is very poorly suited to cultivated crops. Under intensive management it can be used for grasses and legumes.

Included with this soil are a few less severely eroded areas that have a grayish-brown silty clay loam surface layer. Also included are a few areas that have a dark-brown silty clay surface soil. The subsoil is yellowish-red to red clay mottled below a shallow depth with light yellowish brown. A few areas of this inclusion are more slightly eroded than the rest. In these areas the surface layer is dark-brown silty clay loam.

Crossville series

The Crossville series consists of well-drained, shallow and moderately deep soils on the plateaus. These soils were derived from sandstone conglomerate on the Pottsville formation. The shallow soils are generally 15 to 20 inches deep to the sandstone conglomerate. The moderately deep soils are about 30 to 36 inches deep to bedrock. They are mapped as moderately deep phases and occur mainly on Gunters Mountain and some on Brindley Mountain (fig. 9). In many areas of the shallow soils, rock outcrops and loose stones, about 3 to 10 inches in diameter, occur throughout the profile. The moderately deep soils are generally free of outcrops and loose stones, and they contain more sand than the shallow soils. Crossville soils are relatively low in fertility.

These soils are associated with the Hartsells, Linker, and Muskingum soils. They are browner than these associated soils. The moderately deep Crossville soils have about the same depth as the normal Hartsells soils. The shallow Crossville soils have about the same depth as the shallow Hartsells soils. Crossville soils are shallower than the Linker and deeper than the Muskingum soils.

***Figure 9.*—Soil profile of Crossville loam on Brindley Mountain showing the abrupt boundary of the subsoil and bedrock and the shallow depth (about 18 inches) of the soil.**

Profile description in a disturbed area (Crossville loam, eroded sloping phase):

A_p 0 to 6 inches, dark-brown (10YR 3/4) loam; weak fine and medium granular structure; very friable; angular rock fragments and stones; strongly acid; 4 to 7 inches thick; gradual wavy boundary.

B_1 6 to 10 inches, dark-brown (10YR 4/3) loam to fine sandy loam; weak medium and coarse granular structure; very friable; angular rock fragments and stones; strongly acid; 1 to 6 inches thick; gradual wavy boundary.

B_2 10 to 18 inches, dark-brown (7.5YR 4/4) to reddish-brown (5YR 4/4) fine sandy clay loam to fine sandy loam; weak coarse granular to weak fine subangular blocky structure; friable to very friable; angular rock fragments and stones; strongly acid; 6 to 12 inches thick; abrupt wavy boundary.

D 18 inches+, bedrock of acid sandstone and sandstone conglomerate.

Range in characteristics: In places quartz gravel occurs on the surface and just above bedrock. A C horizon that is several inches thick occurs in places. It consists mostly of sandstone fragments and quartz gravel. In a few spots the lower B horizon is yellowish brown (10YR 5/6) to olive brown (2.5Y 4/4). The surface soil ranges from loam to fine sandy clay loam. The subsoil generally ranges from a fine sandy clay loam to fine sandy loam, but the subsoil in some small spots is clay loam.

Topography: Gently sloping to sloping.

Drainage: Surface runoff is medium to moderately rapid. Permeability is moderate, and internal drainage is medium. These soils are droughty during long dry periods.

Native vegetation: Dominantly oak and hickory and some pines.

Crossville loam, eroded gently sloping phase (2 to 6 percent slopes) (CkB2) (Capability unit IIIe–3).—Because this soil is shallow to bedrock and droughty, it is not well suited to row crops. In some places seepage spots occur during wet periods. Included are areas that have a fine sandy loam or sandy loam surface soil. Also included are spots that are 30 inches deep to bedrock.

Crossville loam, eroded sloping phase (6 to 10 percent slopes) (CkC2) (Capability unit VIe–4).—Rock outcrops are more common on this soil than on Crossville loam, eroded gently sloping phase. Because of its shallow depth, strong slope, and rock outcrops, this soil is better suited to grass and legume pastures than to crops.

Crossville fine sandy loam, eroded gently sloping moderately deep phase (2 to 6 percent slopes) (CgB2) (Capability unit IIe–3).—This is the most extensive soil of the Crossville series. It has good tilth, good workability, and a fairly wide range of crop suitability. Included are small areas that are only slightly eroded.

Crossville fine sandy loam, eroded sloping moderately deep phase (6 to 10 percent slopes) (CgC2) (Capability unit IIIe–3).—Because of its stronger slopes, this soil has more rapid runoff than Crossville fine sandy loam, eroded gently sloping moderately deep phase, and it needs more intensive management. Included are small areas that are only slightly eroded.

Crossville fine sandy clay loam, severely eroded sloping moderately deep phase (6 to 10 percent slopes) (ChC3) (Capability unit IVe–3).—This soil has a 6-inch plow layer of brown fine sandy clay loam. It is normally about 8 to 10 inches shallower to bedrock than Crossville fine sandy loam, eroded gently sloping moderately deep phase, and has poorer tilth and more rapid runoff. Because it is shallow and low in moisture-holding capacity, this soil is better suited to pasture and hay than to row crops.

Cumberland and Hermitage series

The Cumberland soils and the Hermitage soils are similar, but they have developed in dissimilar positions and from dissimilar parent material. The parent material of the Hermitage soil is old local colluvium derived from limestone residuum that fell or was washed from adjacent uplands. The parent material of the Cumberland soils is old general alluvium that was transported by large streams. The Cumberland soils occur on high stream terraces; the Hermitage are on old colluvial positions. Soils of both of these series are located in Browns Valley, Big Spring Valley, and on both sides of Dividing Ridge. These soils are extremely erodible. Some of the most severely eroded areas are on the west side of Dividing Ridge. These soils are low in fertility but they respond to fertilization. Except in the eroded areas, they have a fairly high water-holding capacity.

The Cumberland and Hermitage soils are associated with the Etowah, Minvale, and the Allen-Waynesboro soils. They are redder than the Etowah soils and have a finer textured subsoil. They have a darker colored subsoil than the Minvale and Fullerton soils and contain less sand throughout the profile than the Allen-Waynesboro soils.

Profile description (Cumberland and Hermitage silt loams, eroded gently sloping phases):

AB_p 0 to 5 inches, dark-brown (7.5YR 3/2) to reddish-brown (5YR 4/3 to 5YR 4/4) or yellowish-red (5YR 4/6) silt loam; weak medium and coarse granular structure; friable to very friable; strongly acid; 4 to 6 inches thick; abrupt wavy boundary.

B_1 5 to 8 inches, dark-red (2YR 3/6) to dark reddish-brown (5YR 3/4) silty clay loam; weak coarse and moderate fine subangular blocky structure; friable; strongly acid; 1 to 6 inches thick; gradual wavy boundary.

B_2 8 to 48 inches, dark-red (2.5YR 3/6) to red (2.5YR 4/6) clay; moderate medium subangular blocky structure; friable to firm; strongly acid; prominent clay skins on ped surfaces; many feet thick.

Range in characteristics: Several areas in Browns Valley have a loam surface soil. In places the Hermitage soils have a dark reddish-brown (5YR 3/4) surface soil and subsoil. Their subsoil contains small chert fragments that form lenses 3 to 6 inches thick, generally at depths of 5 to 10 feet. In places the subsoil of the Cumberland and Hermitage soils is firm when moist and slightly plastic when wet. Small areas have a yellowish-red (5YR 4/6) subsoil, the lower part of which has few, fine, faint mottles of dark brown (7.5YR 4/4) and yellowish red (5YR 4/6).

Topography: Gently sloping to moderately steep.

Drainage: Surface runoff is moderate to rapid. It is rapid on the steeper slopes and on all severely eroded areas. Permeability is moderate, and internal drainage is medium.

Native vegetation: Oak of various kinds, hickory, maple, shortleaf pine, loblolly pine, and some cedar.

Cumberland and Hermitage silt loams, eroded gently sloping phases (2 to 6 percent slopes) (CmB2) (Capability unit IIe–1).—Because of their gentle slopes, relatively thick surface soil that is easy to work, and high moisture-supplying capacity, these soils are well suited to crops.

Cumberland and Hermitage silt loams, eroded sloping phases (6 to 10 percent slopes) (CmC2) (Capability unit IIIe–1).—Because of their stronger slopes and higher risk of erosion, these soils are not so well suited to cultivation as Cumberland and Hermitage silt loams, eroded gently sloping phases.

Cumberland and Hermitage silty clay loams, severely eroded gently sloping phases (2 to 6 percent slopes) (CnB3) (Capability unit IIIe–1).—These soils have a dark reddish-brown to dark-red surface layer that contains less organic matter than the surface layer of Cumberland and Hermitage silt loams, eroded gently sloping phases. The soils are less well suited to crops than the eroded gently sloping phases and need more intensive management. Some rills and a few deep gullies have been caused by erosion in a few places.

Cumberland and Hermitage silty clay loams, severely eroded sloping phases (6 to 10 percent slopes) (CnC3) (Capability unit IIIe–1).—These soils have a dark reddish-brown to dark-red silty clay loam surface layer. Some rills and a few deep gullies occur in places. The soils are less well suited to cultivation than the eroded gently sloping and sloping phases of Cumberland and Hermitage silt loams, and they need more intensive management.

Cumberland and Hermitage silty clay loams, severely eroded strongly sloping phases (10 to 15 percent slopes) (CnD3) (Capability unit VIe–1).—These soils have a dark reddish-brown to dark-red silty clay loam surface layer. A few deep gullies occur in places. The soils are not suited to row crops but can be used for hay and pasture. They are well suited to forest. Included are several less severely eroded areas that have a surface layer of dark-brown silt loam.

Cumberland and Hermitage silty clay loams, severely eroded moderately steep phases (15 to 25 percent slopes) (CnE3) (Capability unit VIIe–1).—These soils have a dark reddish-brown to dark-red silty clay loam surface layer. Rills and a few deep gullies occur in places. The soils are better suited to forest than to crops. Included in this mapping unit are small areas that are less severely eroded than these soils. These inclusions have a dark-brown silt loam surface layer.

Egam series

The Egam series consists of moderately well drained to well drained soils in the limestone valleys. The parent material is alluvium that was washed chiefly from soils derived from limestone but partly from soils derived from shale, sandstone, and other rock. These soils occur mostly along the Tennessee River and in Kennamer Cove. They are flooded at times. They have a fairly high water-holding capacity. These soils are relatively fertile.

Egam soils are closely associated with the Egam-Newark complex and with the Melvin soils. In places they occur with the Pope and Huntington soils on the first bottoms. Egam soils are better drained than the Melvin soils. They are also better drained than the Newark part of the Egam-Newark complex. They are finer textured than the Pope and Huntington soils and less acid than the Pope soils.

Profile description (Egam silty clay loam):

0 to 8 inches, dark-brown (10YR 3/3) silty clay loam; weak coarse granular and weak fine subangular blocky structure; friable; slightly acid to neutral; 6 to 12 inches thick; abrupt boundary.

8 to 30 inches, very dark brown (10YR 2/2) silty clay; weak to moderate medium subangular blocky structure; some small, rounded, black concretions; firm; slightly acid to neutral; 20 to 30 inches thick; diffuse boundary.

30 to 48 inches, very dark brown (10YR 2/2) silty clay with common, fine, faint mottles of dark brown (7.5YR 3/2); some small, rounded, black concretions; moderate medium subangular blocky structure; slightly acid to neutral; many feet deep.

Range in characteristics: Mottles occur at a shallower depth and are more numerous where Egam soils grade toward the Newark soils. In small areas in Kennamer Cove about 1 inch of fine sandy loam or very fine sandy loam overlies the silty clay loam.

Topography: Nearly level to gently sloping.

Drainage: Runoff is slow to moderately slow. Permeability is moderate to moderately slow, and internal drainage is medium to moderately slow.

Native vegetation: Mainly hardwoods mixed with some pine. Oak and hickory are dominant.

Egam silty clay loam (0 to 2 percent slopes) (Ea) (Capability unit IIw–2).—This soil is well suited to corn and to grass and legume pastures. Crops may be damaged by flooding.

Egam silty clay loam, sandy substratum phase (0 to 2 percent slopes) (Eb) (Capability unit IIw–2).—This soil differs from Egam silty clay loam in having a 24- to 36-inch layer of dark-brown silty clay loam that overlies a dark-brown very fine sandy loam substratum. This soil is well suited to corn and pasture, but crops may be damaged by flooding.

Egam-Newark soils

The Egam and the Newark soils occur so closely together in places that it is not practical to show them separately on the soil map. In these places they are mapped together as a soil complex. The parent materials of these soils have been washed from soil material underlain mostly by limestone but partly by other rock. These soils occur together on the first bottoms of the limestone valleys, mainly in Kennamer Cove and along the Tennessee River. The Egam soils are moderately well drained and the Newark soils are somewhat poorly drained. The soils of both series are likely to be flooded at times. They hold moisture well for long dry periods.

A profile of the Egam part of this complex is described for the Egam series.

The following describes a profile of Newark silty clay loam:

0 to 8 inches, dark-brown (10YR 3/3) silty clay loam; weak coarse granular and weak fine subangular blocky structure; friable; slightly acid to slightly alkaline; 6 to 10 inches thick; gradual boundary.

8 to 14 inches, dark grayish-brown (10YR 4/2) to very dark grayish-brown (10YR 3/2) silty clay; common, fine, faint mottles of dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/8); weak to moderate subangular blocky structure; small, rounded, black concretions; friable; slightly acid to slightly alkaline; 4 to 8 inches thick; gradual boundary.

14 to 40 inches, very dark grayish-brown (10YR 3/2) silty clay; many coarse, prominent mottles of dark grayish brown (10YR 4/4), brown (10YR 5/3), strong brown (7.5YR 5/8), and very dark brown (10YR 2/2); moderate medium subangular blocky structure; small, rounded, black concretions; firm; slightly acid to slightly alkaline; many feet deep.

Range in characteristics: In places the surface is covered by a layer about 1 inch thick that grades in texture from silt loam to fine sandy loam.

Topography: Nearly level to level.

Drainage: Surface runoff, permeability, and internal drainage are slow.

Native vegetation: Mainly white oak, sweetgum, sycamore, and elm.

Egam-Newark silty clay loams (0 to 6 percent slopes) (Ec) (Capability unit IIIw–1).—These soils are generally well suited to corn and to grasses and legumes grown for pasture.

Etowah series

The Etowah series consists of deep, well-drained soils that occur mostly in Browns Valley on gentle slopes. The parent material is old to moderately old alluvium that was derived from limestone and some sandstone and shale. These soils are associated with the Cumberland and Hermitage soils and with the Captina soils. They have a lighter brown surface soil and a more friable, more permeable subsoil than have the Cumberland and Hermitage soils. They are less compact and better drained than the Captina soils and contain no pan (fig. 10).

Figure 10.—**Irrigating corn on Etowah loam, eroded gently sloping phase, in an area west of Guntersville. Dividing Ridge and portions of Sand Mountain in background.**

Typical profile (Etowah loam, eroded gently sloping phase):

A_p 0 to 7 inches, dark reddish-brown (5YR 3/2) loam; weak fine and medium granular structure; very friable; strongly acid; 4 to 8 inches thick; abrupt wavy boundary.

B_1 7 to 15 inches, dark reddish-brown (5YR 3/3) silty clay loam; weak very fine and fine subangular blocky structure; friable; strongly acid; 5 to 12 inches thick; gradual wavy boundary.

B_2 15 to 48 inches+, dark reddish-brown (5YR 3/4) silty clay loam; weak fine and medium subangular blocky structure; friable; strongly acid; many feet thick.

Range in characteristics: Areas of Etowah soil that are near Captina soils, or other less well drained soils, have at a depth of 36 inches material that is lighter colored than typical. An area on Highway 431, about three-fourths mile northwest of the triangle at Claysville, contains more sand in the subsoil than the soil described. The texture of this soil is intermediate between the Etowah and Sequatchie soils.

Topography: Level to gently sloping.

Drainage: Runoff is medium. Permeability is moderate, and internal drainage is medium.

Native vegetation: White oak, red oak, black oak, post oak, hickory, sweetgum, dogwood, shortleaf pine, loblolly pine, and some cedar.

Etowah loam, eroded gently sloping phase (2 to 6 percent slopes) (EdB2) (Capability unit IIe-1).—This soil is very well suited to crops because it has gentle slopes, a fairly deep surface layer, good tilth, and relatively high water-holding capacity. It is not likely to erode, and it responds to fertilizer. A few small less severely eroded areas have an 8- to 12-inch surface layer. Some small inclusions are level. Other inclusions have a silt loam surface layer.

Fullerton series

In the Fullerton series are deep, friable, well-drained soils that developed in residuum derived from cherty limestone. These soils occur on the cherty ridges in the limestone valleys. Their parent rock was Fort Payne chert. The largest areas of these soils are on the top and the eastern side of Dividing Ridge. The Fullerton soils are highly erodible. In many cleared areas, they are severely eroded. Their water-holding capacity is moderate, and their fertility is low.

These soils are associated with the Minvale, Cumberland, Hermitage, and Lobelville soils. They are on higher positions than the Cumberland and Hermitage soils and differ from them mainly in having much chert in the profile.

Typical profile (Fullerton cherty silt loam, strongly sloping phase):

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2) cherty silt loam; weak fine to medium granular structure; very friable; strongly acid; 1 to 3 inches thick; abrupt wavy boundary.

A_2 1 to 9 inches, yellowish-brown (10YR 5/4) cherty silt loam; weak fine and medium granular structure; very friable; strongly acid; 6 to 10 inches thick; gradual wavy boundary.

B_1 9 to 12 inches, yellowish-brown (10YR 5/6) cherty silt loam; weak coarse granular and weak fine subangular blocky structure; friable; strongly acid; 2 to 8 inches thick; gradual wavy boundary.

B_{21} 12 to 22 inches, reddish-yellow (5YR 6/8) cherty silty clay loam; weak medium subangular blocky structure; friable; strongly acid; 8 to 18 inches thick; gradual wavy boundary.

B_{22} 22 to 50 inches+, yellowish-red (5YR 5/8) cherty silty clay; moderate medium subangular blocky structure; firm to friable; strongly acid; may be many feet deep to bedrock.

Range in characteristics: In some places enough chert fragments occur on the surface to interfere with tillage. The fragments are 1 to 10 inches in diameter. The lower part of the B horizon is heavy plastic and sticky clay in places. In a few small spots the soil is lighter colored than that described and resembles Clarksville soils. In places the soil is about 36 inches deep, but generally it is much deeper.

Topography: Strongly sloping to steep. Some small areas have slopes of less than 10 percent.

Drainage: Surface drainage is medium to rapid. Permeability is moderate, and internal drainage is medium.

Native vegetation: Mostly post oak, red oak, black oak, and other hardwoods; some hickory and dogwood.

Fullerton cherty silt loam, strongly sloping phase (10 to 15 percent slopes) (FaD) (Capability unit IVe-3).—This soil is poorly suited to crops because of its strong slope, cherty surface layer, and low fertility. It is better suited to pasture and to forest.

Fullerton cherty silt loam, eroded strongly sloping phase (10 to 15 percent slopes) (FaD2) (Capability unit IVe-3).—This soil differs from Fullerton cherty silt loam, strongly sloping phase, in having a yellowish-brown to reddish-yellow cherty silt loam surface layer. Because of its strong slope, shallow depth, heavy and cherty plow layer, low fertility, and reduced moisture-holding capacity, this soil is poorly suited to cultivation. It is better suited to pasture or forest. Included with this soil are areas that have a cherty silty clay loam surface layer.

Fullerton cherty silt loam, moderately steep phase (15 to 25 percent slopes) (FaE) (Capability unit VIe-1).—This soil is not suited to crops and pasture. Its best use is for forest.

Fullerton cherty silt loam, eroded moderately steep phase (15 to 25 percent slopes) (FaE2) (Capability unit VIe-1).—This soil has a yellowish-brown to reddish-yellow surface layer that has less organic matter than the surface layer of Fullerton cherty silt loam, moderately steep phase. This soil is not suitable for cultivation. Its best use is for forest. Included are some severely eroded areas that have a surface layer of reddish-yellow to yellowish-red cherty silty clay loam. These inclusions contain less organic matter than the surface layer of the less severely eroded areas, and they have more rapid surface runoff.

Fullerton cherty silty clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (FbD3) (Capability unit VIe-1).—This soil has a reddish-yellow to yellowish-red plow layer. Because of its clayey surface soil, poor tilth, low moisture-holding capacity, and other adverse features, this soil is not suited to crops. It can be used for pasture but is best used for forest.

Fullerton-Clarksville soils

The Fullerton soils and the Clarksville soils occur together on steep slopes of the chert ridges in the limestone valleys. The parent material of these soils is residual from Fort Payne chert. These soils are mapped together as one unit. The profile of the Fullerton soil is similar to that described for the Fullerton series. The Clarksville parts of the unit differ from the Fullerton parts in that they are more cherty, more thoroughly leached in the surface soil, and are yellowish brown rather than yellowish red in the subsoil.

Profile in an undisturbed area (Clarksville cherty silt loam):

A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) cherty silt loam, high in organic matter; weak fine granular structure; very friable; strongly acid; 1 to 3 inches thick; abrupt wavy boundary.

A_2 2 to 12 inches, dark grayish-brown (10YR 4/2) cherty silt loam; weak fine granular structure; very friable; strongly acid; 8 to 11 inches thick; abrupt wavy boundary.

B_2 12 to 48 inches, yellowish-brown (10YR 5/4) silty clay loam to silty clay; weak fine subangular blocky structure; friable; very strongly acid; 3 feet to many feet thick.

Range in characteristics: Chert fragments range from 1 to 10 inches in diameter; locally the surface is completely covered with angular chert fragments.

Topography: Steep.

Drainage: Surface runoff is relatively high. Permeability is moderate, and internal drainage is medium.

Native vegetation: Post, red, white, and black oaks, hickory, dogwood, and a few pines.

Fullerton-Clarksville cherty silt loams, steep phases (more than 25 percent slopes) (FcF) (Capability unit

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VIIe–1).—Much of this unit is in cutover native forest. The small part that has been cultivated has a 4- to 6-inch plow layer of grayish-brown cherty silt loam and a subsoil of a yellowish-brown or yellowish-red cherty silty clay loam.

Gullied land

Gullied land consists of areas that are so severely eroded that they are difficult to reclaim for use for crops or pasture. Many areas have an intricate pattern of gullies, some of which cannot be crossed by farm machinery. Most areas of Gullied land are small. Much of the acreage was formerly areas of Cumberland and Hermitage soils, Alcoa soils, and Colbert soils.

Practically all of the Gullied land once used for crops and pasture has been abandoned. A few places have fairly good stands of pine, but most places have weedy growths of sassafras, briers, persimmons, broomsedge, and honeysuckle. Some Gullied land, especially the areas that were Cumberland and Hermitage soils, can be reclaimed for growing pasture and hay. Such reclamation will be expensive. The best use for this land is forest (fig. 11).

Gullied land (6 to 15 percent slopes) (Ga) (Capability unit VIIe–1).—The original surface soil of the land has been removed over a great part of the acreage. In places the subsoil has been lost, and in some places the bedrock is exposed. Some tracts, however, retain much of the original surface layer, but these areas are so deeply gullied that cultivation is not practical.

Hartsells series

The Hartsells series consists of well-drained, strongly acid soils that are widely distributed on the plateaus. These soils, the most extensive in the county, occur on the Pottsville formation. The parent material has weathered mostly from sandstone and sandstone conglomerate, but it was affected in some places by shale. The sandstone was fine grained to moderately coarse grained. Most of the sandstone was massive or thick bedded, but in places it was thin bedded. In places a weakly cemented pan, or a compact layer, overlies the parent material. This layer is several inches thick and has a few, medium, faint, light-gray (10YR 7/2) mottles. It is so weakly cemented that it does not materially impair tilth or impede the penetration of water or roots.

Figure 11.—Gullied land in Browns Valley showing the excessive mutilation of the area and almost total lack of vegetation.

Hartsells soils are closely associated with Linker, Albertville, Tilsit, Crossville, and Muskingum soils. Their subsoil is less red than that of the Linker soils and coarser textured than that of the Albertville soils. They are deeper and more strongly developed than the Muskingum soils. They lack the fragipan of the Tilsit soils. Hartsells soils are not so brown and are coarser textured than the Crossville soils and are slightly less firm. Although rock outcrops occur, they are not so common as on Crossville soils. In areas where Hartsells soils occur with Crossville soils, they are browner than typical. Where they are next to the Linker soils, they have a yellowish-red subsoil. In some places where the Hartsells and Albertville soils meet, the pattern of the two soils is complex and the soil boundary is indistinct. Generally Hartsells soils are somewhat finer textured than typical near these contact areas.

The Hartsells soils generally range in depth from 10 to 40 inches; in places they are deeper. The soils that are 10 to 18 inches deep are mapped as shallow phases. These shallow soils are more droughty than the deeper soils and less well suited to crops. The deep Hartsells soils have a high water-holding capacity and hold moisture available to plants for long periods. They are subject to moderate erosion, mostly sheet erosion. Some rill erosion occurs in places, particularly where the terraces are broken. These soils are low in fertility but are very responsive to fertilization.

Profile in an undisturbed area (Hartsells fine sandy loam):

A_0 ¼ to 0 inch, black (10YR 2/1) humus layer held in a mat of fine roots; strongly acid; abrupt smooth boundary.

A_2 0 to 8 inches, grayish-brown (10YR 5/2) fine sandy loam with weak fine granular structure; very friable; strongly acid; 6 to 10 inches thick; gradual wavy boundary.

A_3 8 to 10 inches, yellowish-brown (10YR 5/4) fine sandy loam with weak fine and medium granular structure; very friable; strongly acid; 0 to 5 inches thick; gradual wavy boundary.

B_2 10 to 24 inches, yellowish-brown (10YR 5/4 to 10YR 5/6) fine sandy loam to light fine sandy clay loam; weak fine and medium subangular blocky structure; friable; strongly acid; 10 to 24 inches thick; gradual wavy boundary.

B_3 24 to 36 inches, yellowish-brown (10YR 5/4 to 10YR 5/6) light fine sandy loam with weak fine subangular blocky and weak medium granular structure; very friable; strongly acid; 1 to 15 inches thick; gradual wavy boundary.

C 36 inches+, yellowish-brown (10YR 5/4 to 10YR 5/6) loamy sand; structureless (single grain); very friable; strongly acid; highly weathered sandstone material.

Range in characteristics: A thin A_1 layer of black (10YR 2/1) to very dark gray (10YR 3/1) humus occurs in some wooded areas. In places the B horizon contains some sandstone gravel. Mainly on Brindley Mountain in the Ruth Community, many sandstone rock fragments, 1 to 6 inches in diameter, are on the surface and in the soil. Some areas have a dark-brown (10YR 4/3 and 7.5YR 4/4) to dark yellowish-brown (10YR 4/4) surface soil and subsoil. Moderately and severely eroded areas have a yellowish-brown (10YR 5/4) surface layer. A few lenses of silty clay that were weathered from thin beds of shale occur in lower B and in the C horizon. They are mottled strong brown (7.5YR 5/6) and red (10YR 4/8).

Topography: Gently sloping to strongly sloping.

Drainage: Surface runoff is medium, permeability is moderate to moderately rapid, and internal drainage is medium.

Native vegetation: Mainly oak, hickory, and pine; some dogwood and maple.

Profile description (Hartsells fine sandy loam, eroded gently sloping shallow phase):

A_p 0 to 6 inches, yellowish-brown (10YR 5/4) to grayish-brown (10YR 5/2) fine sandy loam; weak fine to medium granular structure; very friable; strongly acid; 4 to 7 inches thick; abrupt smooth boundary.

B 6 to 15 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak medium to coarse granular structure; friable to very friable; strongly acid; 6 to 12 inches thick; diffuse wavy boundary.

C_1 15 to 26 inches, yellowish-brown (10YR 5/4) loamy sand; single grain; friable to very friable; strongly acid; 4 to 12 inches thick; abrupt wavy boundary.

D 26 inches +, sandstone rock.

Hartsells fine sandy loam, gently sloping phase (2 to 6 percent slopes) (HaB) (Capability unit IIe–3).—This is the best soil of the Hartsells series for growing crops. It is suited to intensive use and has a fairly wide range of crop suitability.

Hartsells fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (HaB2) (Capability unit IIe–3).—This soil has the same range of suitability as Hartsells fine sandy loam, gently sloping phase, but it needs more exacting management (fig. 12). Its yellowish-brown to dark yellowish-brown plow layer contains less organic matter.

Hartsells fine sandy loam, sloping phase (6 to 10 percent slopes) (HaC) (Capability unit IIIe–3).—This soil is similar to Hartsells fine sandy loam, gently sloping phase, but, because of its stronger slopes and more rapid runoff, it is more difficult to conserve.

Hartsells fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (HaC2) (Capability unit IIIe–3).—This soil has a yellowish-brown to dark yellowish-brown surface soil. It contains less organic matter than Hartsells fine sandy loam, gently sloping phase. Because of its stronger slopes, it needs more exacting management. Included with this soil are some severely eroded areas that have a yellowish-brown fine sandy clay loam surface soil.

Hartsells fine sandy loam, eroded gently sloping shallow phase (2 to 6 percent slopes) (HbB2) (Capability unit IIIe–3).—A profile of this soil is given in the series description. Because it is shallow and low in water-holding capacity, this soil is not so well suited to crops as Hartsells fine sandy loam, eroded gently sloping phase.

Hartsells fine sandy loam, eroded sloping shallow phase (6 to 10 percent slopes) (HbC2) (Capability unit IVe–3).—This soil is better suited to pasture and hay than to cultivated crops.

Hartsells fine sandy loam, eroded strongly sloping shallow phase (10 to 15 percent slopes) (HbD2) (Capability unit VIe–1).—This soil is not suited to cultivated crops; it should be kept in hay, pasture, or forest.

Hartsells fine sandy clay loam, severely eroded sloping phase (6 to 10 percent slopes) (HcC3) (Capability unit IVe–3).—This soil has lost at least 75 percent of its original surface layer. The present plow layer is yellowish-brown to dark yellowish-brown light fine sandy clay loam. In some places the B_2 and B_3 layers have been largely affected by shale and contain more clay than typical for the series. The subsoil material is commonly at the surface on the more exposed parts of the slopes. This soil is not so well suited to crops as the less severely eroded Hartsells soils. Included are several areas on the southern part of Sand Mountain that have slopes greater than 10 percent. Also included are some areas that have a fine sandy loam surface layer.

Figure 12.—**Cattle grazing on a mixed pasture of Kentucky 31 fescue, rescuegrass, and Ladino clover on Hartsells fine sandy loam, eroded gently sloping phase. Farm ponds for watering stock and for fishing are common in the county.**

Hartsells fine sandy clay loam, severely eroded gently sloping shallow phase (2 to 6 percent slopes) (HdB3) (Capability unit IVe–3).—This soil contains much less organic matter in the surface layer than does Hartsells fine sandy loam, eroded gently sloping shallow phase. It generally has active rill erosion and sheet erosion. This soil is not suited to row crops. It is suited to small grains, legumes, and pasture grasses and to other close-growing crops.

Hollywood series

The Hollywood series consists of somewhat poorly drained soils that have developed from highly clayey old and recent colluvium at the base of the limestone knobs of Rockland, limestone. The recent colluvium had been deposited over the old colluvium. These inextensive soils occur mainly in Browns Valley and Paint Rock Valley. During wet weather, the water table is high; water may stand for long periods. The surface of these soils is cracked when the soils are dry. The water-holding capacity is low. Hollywood soils are associated with the Colbert soils. They differ from the Colbert soils in being black and more poorly drained.

Typical profile in a disturbed area (Hollywood clay):

0 to 6 inches, black (10YR 2/1) clay; weak moderate to fine subangular blocky structure; friable; sticky when wet; slightly alkaline; 3 to 7 inches thick; abrupt wavy boundary.

6 to 18 inches, black (10YR 2/1) clay; structureless (massive); abundance of black concretions; firm to very firm when moist; very plastic when wet; slightly alkaline; 10 to 20 inches thick; gradual wavy boundary.

18 to 27 inches, black (10YR 2/1) clay; many coarse, distinct mottles of strong brown (7.5YR 5/6), very dark brown (10YR 2/2), and yellowish brown (10YR 5/4); black concretions common; structureless (massive); firm to very firm when moist, plastic when wet; slightly alkaline; 6 to 18 inches thick; gradual wavy boundary.

27 to 40 inches +, yellowish-brown (10YR 5/6) clay; many, coarse, distinct mottles of grayish brown (10YR 5/2);

black concretions common but fewer than in layer above; structureless (massive); firm when moist, plastic when wet; slightly neutral; 10 inches to many feet thick.

Range in characteristics: In places a few fragments of limestone and some chert occur on the surface and in the upper 6 inches. Fragments generally are 1 to 2 inches in diameter. The surface soil is very dark gray (10YR 3/2) in places.

Topography: Level to nearly level.

Drainage: Runoff, permeability, and internal drainage are slow. Seepage occurs during wet periods.

Native vegetation: Cedar, post and willow oaks, hickory, honeylocust, sweetgum, and blackgum.

Hollywood clay (0 to 2 percent slopes) (He) (Capability unit IIIw-2).—This soil is the only Hollywood soil in the county. It is described in the series description. Included with this soil are some areas that have a silty clay surface soil. This soil is suited to pasture and hay.

Huntington series

The Huntington series consists of well-drained, very friable soils that occur on local alluvium and general alluvium in the limestone valleys. The parent material was washed mainly from soils that were developed on limestone, but some of the material came from soils developed on shale and sandstone intermixed. In places the general alluvium contains micaceous material, indicating that it was transported from the gneiss, schist, and granite areas of western North Carolina.

The Huntington soils that developed on local alluvium are mapped as local alluvium phases. These soils are not extensive. They have developed from material that has been recently deposited in colluvial positions. The parent material was washed from higher lying soils such as the Cumberland and Hermitage, the Etowah, and, to lesser extent, from the Allen-Waynesboro soils.

The Huntington soils are associated with the Egam, Newark, and Melvin soils. They are coarser in texture and have a less compact subsoil than have the Egam soils, and they are less droughty.

Profile description (Huntington silt loam on general alluvium):

0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak fine and medium granular structure; very friable; slightly acid; 6 to 10 inches thick; gradual wavy boundary.

8 to 42 inches+, dark-brown (10YR 3/3) silt loam; weak medium and coarse granular structure; very friable; medium acid; 3 to many feet thick.

Profile description (Huntington silt loam, local alluvium phase):

0 to 36 inches, dark reddish-brown (5YR 3/3) silt loam; weak medium and coarse granular structure; very friable; strongly to moderately acid; 18 to 50 inches thick; diffuse boundary.

36 to 52 inches+, dark-brown (7.5YR 3/2) silt loam; few, fine, distinct mottles of black (10YR 2/1) and dark reddish-brown (5YR 3/3); weak medium and coarse granular structure; few, small, rounded concretions; very friable; strongly acid; 12 inches to several feet thick.

Range in characteristics: The surface soil ranges from silt loam to fine sandy loam. The local alluvium phases are distinguished by their dark-brown surface soil and brown to reddish-brown subsurface layer. Chert fragments are common on some areas of the local alluvium.

Topography: Level to nearly level.

Drainage: Runoff is slow, permeability is moderate, and internal drainage is medium.

Huntington silt loam (0 to 2 percent slopes) (Hh) (Capability unit IIw-2).—This inextensive soil occurs on general alluvium on first bottoms along the south side of the Tennessee River in the western part of the county. It is likely to be flooded at times. This soil is highly productive and has a wide range of crop suitability. It is used mostly for corn, but a small acreage is in pasture.

Huntington silt loam, local alluvium phase (0 to 2 percent slopes) (Hk) (Capability unit I-3).—This soil is not likely to be flooded, but water may stand in the more depressed parts for a short period after prolonged rains. The soil has a wide range of crop suitability. It has excellent tilth and is easily worked. It is used chiefly for crops and pasture.

Huntington fine sandy loam (0 to 2 percent slopes) (Hf) (Capability unit IIw-2).—This is the most extensive Huntington soil that occurs on general alluvium. It has a much higher content of fine sand throughout its profile than Huntington silt loam. This soil is likely to be flooded at times. It has excellent tilth, good moisture-holding capacity, and is easy to work. Although generally low in fertility, it responds well to proper fertilizer.

Huntington loam, local alluvium phase (0 to 2 percent slopes) (Hg) (Capability unit I-3).—In use and characteristics, this soil is similar to Huntington silt loam, local alluvium phase, except that it contains more fine sand in the profile. This soil is not likely to be flooded.

Jefferson series

The Jefferson series consists of deep, well-drained, light-colored soils derived from old colluvium in the limestone valleys. These soils occur on the foot slopes of the rocky bluffs that rise from the valley to the plateaus. Their parent materials have washed or rolled chiefly from sandstone but partly from shale and limestone. These soils are subject to moderate erosion. They have a high water-holding capacity.

The Jefferson soils are associated mainly with Allen and Waynesboro soils, and, to a lesser extent, with the Cumberland and Hermitage soils. They are lighter in color than the Allen and Waynesboro soils and lighter in texture and color than the Cumberland and Hermitage soils.

Profile of an uneroded inclusion in Jefferson fine sandy loam, eroded gently sloping phase:

A_1 0 to 3 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 1 to 4 inches thick; abrupt wavy boundary.

A_2 3 to 10 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

B 10 to 48 inches, yellowish-brown (10YR 5/6) fine sandy loam to fine sandy clay loam; weak fine and medium subangular blocky structure; friable; strongly acid; many feet deep.

Range in characteristics: In places various amounts of loose stones, 1 to 6 inches in diameter, occur on the surface. Some areas have chert fragments on the surface. The surface layer is dark brown (10YR 4/3). In places the subsoil is dark brown (7.5YR 4/4).

Topography: Gently sloping to moderately steep.

Drainage: Runoff is medium, permeability is moderate, and internal drainage is medium.

Native vegetation: Red oak, white oak, black oak, post oak, hickory, dogwood, shortleaf pine, and loblolly pine.

Jefferson fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (JaB2) (Capability unit IIe–3).—This soil has a yellowish-brown to grayish-brown surface layer that is 5 to 7 inches thick and contains less organic matter than the surface layer of the uneroded inclusion described for the series. It is the best soil in the Jefferson series for crops. Included with this soil are several areas that are not materially eroded. These areas have a profile like that described for the series.

Jefferson fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (JaC2) (Capability unit IIIe–3).—This soil has a yellowish-brown to grayish-brown surface layer that is 5 to 7 inches thick and contains less organic matter than the surface layer of the uneroded inclusion described for the series. This soil is suited to row crops; but because it has more rapid runoff, it needs more intensive management than Jefferson fine sandy loam, eroded gently sloping phase. Included with this soil are several areas that are not materially eroded. These areas have a profile similar to that described for the series.

Jefferson fine sandy loam, moderately steep phase (15 to 25 percent slopes) (JaE) (Capability unit VIe–1).—Because this soil is steeper and generally shallower to the underlying material than Jefferson fine sandy loam, eroded gently sloping phase, its risk of erosion is higher. It is not suited to row crops. It is better suited to permanent grasses, to legumes for hay, and to forest. Included with this soil are some strongly sloping areas that have 10 to 15 percent slopes. Also included are some strongly sloping and moderately steep areas that are more severely eroded than the rest of the mapping unit.

Lindside series

The Lindside series consists of moderately well drained to somewhat poorly drained soils that were derived from material washed from higher lying soils of the limestone valleys. These soils occur in depressions, along drainageways, and at the base of slopes. They are likely to be ponded or flooded during prolonged wet periods. These soils are moderately fertile and respond well to fertilizer.

The Lindside soils are associated with the Cumberland and Hermitage soils, and with the Etowah, Captina, Taft, and Colbert soils. They were derived from materials washed from these soils. They differ from the associated soils in having a deep A horizon, no developed B horizon, and in being more poorly drained. The Lindside soils are also associated with and more poorly drained than Huntington silt loam, local alluvium phase.

Typical profile (Lindside silt loam, local alluvium phase):

0 to 8 inches, dark reddish-brown (5YR 3/3) silt loam; weak medium and coarse granular structure; very friable; strongly acid to moderately acid; 4 to 10 inches thick; gradual boundary.

8 to 18 inches, dark-brown (7.5YR 3/2) silt loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4), strong brown (7.5YR 5/6), and light brownish gray (10YR 6/2); weak medium and coarse granular structure; some rounded black concretions; very friable; strongly acid; 6 to 15 inches thick; abrupt boundary.

18 to 40 inches, gray (10YR 5/1) silt loam to silty clay loam; many, coarse, prominent mottles of strong brown (7.5YR 5/6), yellowish brown (10YR 5/4), light grayish brown (10YR 6/4), dark brown (10YR 3/3), and black (10YR 2/1); weak fine subangular blocky to platy structure; many rounded black concretions; friable; strongly acid; many feet thick.

Range in characteristics: In places the surface soil is lighter colored than that described. The mottling may be close to the surface or as deep as 15 inches. In places the surface layer contains small, rounded concretions.

Topography: Nearly level to level.

Drainage: Surface runoff, permeability, and internal drainage are slow.

Native vegetation: White oak, post oak, hickory, willow, and maple.

Lindside silt loam, local alluvium phase (0 to 2 percent slopes) (La) (Capability unit IIw–1).—This is the only soil of this series mapped in the county. Its characteristics are given in the series description. This soil has a high productivity and a medium range of crop suitability. It is used mostly for corn and pasture.

Linker series

The Linker series consists of well-drained, strongly acid soils that were derived from parent materials weathered on the Pottsville formation. The materials are chiefly from acid sandstone and conglomerate, though in some places they were influenced by shale. These soils occur on the plateaus, normally near mountain escarpments. Their depth to bedrock is generally greater than that of other well-drained soils on the plateau uplands. Linker soils are highly erodible. Sheet erosion is dominant, but in places rill erosion occurs along with the sheet erosion. These soils are low in fertility, but they respond well to fertilizer. Except for the severely eroded areas, they have a high water-holding capacity.

These soils are closely associated with the Hartsells and Crossville and, to a lesser extent, with the Albertville soils. They differ from the Hartsells soils in having a redder and finer textured subsoil. The subsoil is yellowish red in areas transitional to Hartsells soils. Linker soils are redder than the Albertville soils and contain more sand in the subsoil. They are deeper and redder than the Crossville soils. The Linker and Crossville soils apparently have been influenced largely by sandstone conglomerate.

Typical profile (Linker fine sandy loam, eroded gently sloping phase):

A_p 0 to 6 inches, yellowish-brown (10YR 5/6) to grayish-brown (10YR 5/2) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 4 to 7 inches thick; gradual wavy boundary.

B_1 6 to 13 inches, yellowish-red (5YR 5/6 to 5YR 4/8) fine sandy clay loam; weak and moderate medium subangular blocky structure; friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

B_2 13 to 48 inches, red (10YR 4/8) fine sandy clay to clay loam; moderate medium subangular to angular blocky structure; friable to firm; strongly acid; 15 to 40 inches thick; gradual wavy boundary.

D 48 inches, sandstone rock.

Range in characteristics: Quartz pebbles commonly occur on the surface and in the profile. In a few places on the surface there are stones 3 to 10 inches in diameter and small angular and rounded pieces of sandstone as much as 1 inch in diameter. In the moderately eroded areas of Linker soils, the plow layer is a mixture of the surface soil and subsoil and is yellowish red to reddish brown. In some places there is a B_{22} layer that is dark red and of moderate coarse to medium structure. In places the lower part of the B horizon has a few, faint, fine mottles of dark red (10YR 3/6) and dusky red (10R 3/4) and a few, fine, distinct mottles of yellowish brown (10YR 5/6).

Topography: Gently to strongly sloping.

Drainage: Runoff is medium to rapid, permeability is moderate, and internal drainage is medium.

Native vegetation: Mainly pine and oak; some hickory and maple.

Linker fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (LbB2) (Capability unit IIe–3).—Because of its relatively thick surface layer, high water-holding capacity, and other favorable characteristics, this is the best soil of the Linker series for crops. Small uneroded areas, mainly on Gunters Mountain, are included. The surface soil of these inclusions is thicker than that of this soil, and it contains more organic matter. The inclusions have a black to dark-gray A_1 layer and a grayish-brown A_2 layer. Also included are areas that resemble Hartsells soils. A few small areas on the southern part of Sand Mountain have a fine sandy loam surface soil and a silty clay to clay subsoil.

Linker fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (LbC2) (Capability unit IIIe–3).—This soil is generally shallower to parent material than Linker fine sandy loam, eroded gently sloping phase. Because of the stronger slopes and greater risk of further erosion, this soil is less suitable for cultivation than Linker fine sandy loam, eroded gently sloping phase. Small uneroded areas, mainly on Gunters Mountain, are included with this soil. The surface soil of these inclusions is thicker than that of this soil, and it contains more organic matter. The inclusions have a black to dark-gray A_1 layer and a grayish-brown A_2 layer. They are normally a little shallower to parent material than Linker fine sandy loam, eroded gently sloping phase. Small inclusions on McCorkle Mountain, Billy Ridge, and Bob Mountain have a dark reddish-brown (5YR 3/3) loam A layer, a dark reddish-brown (5YR 3/4) clay loam B_1 layer, and a dark-red (2.5YR 3/6) clay to clay loam B_2 layer.

Linker fine sandy loam, eroded strongly sloping phase (10 to 15 percent slopes) (LbD2) (Capability unit IVe–3).—This soil is generally shallower to parent material than the eroded gently sloping and eroded sloping phases of Linker fine sandy loam, and it is less well suited to cultivation. Uneroded areas, chiefly on Gunters Mountain, are included with this soil. The surface soil of these inclusions is thicker than that of this soil and it contains more organic matter. These inclusions have a black to dark-gray A_1 layer and a grayish-brown A_2 layer.

Linker fine sandy clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (LcB3) (Capability unit IIIe–3).—Most of the original surface soil has been removed by erosion. A yellowish-red or red clayey layer is exposed. This layer has much less organic matter than the surface layer of Linker fine sandy loam, eroded gently sloping phase. Because of the clayey surface layer, more rapid runoff, and poorer tilth, this soil is less well suited to cultivation than Linker fine sandy loam, eroded gently sloping phase.

Linker fine sandy clay loam, severely eroded sloping phase (6 to 10 percent slopes) (LcC3) (Capability unit IVe–3).—This soil has a yellowish-red or red clayey surface layer. Normally it is 6 to 10 inches shallower to parent material than Linker fine sandy loam, eroded gently sloping phase. Because of the strong slope, clayey plow layer, and poor tilth, this soil is better suited to pasture and hay than to cotton, corn, and other row crops.

Linker fine sandy clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (LcD3) (Capability unit VIe–1).—This soil has lost all, or almost all, of its original surface layer through accelerated erosion. A red, fine-textured plow layer is exposed. This soil contains less organic matter in the surface layer and is shallower to parent material than Linker fine sandy loam, eroded gently sloping phase, and it has more rapid runoff. It is very poorly suited to row crops. It is best for close-growing small grains or for pasture or hay.

Lobelville series

The Lobelville series consists of moderately well drained to well drained soils that are on recent colluvium. This colluvium has rolled or was washed from soils in the limestone valleys that were derived mainly from weathered chert. The Lobelville soils occur mainly east of Dividing Ridge. They are moderately low in fertility and have a high water-holding capacity.

The Lobelville soils are associated with the Fullerton-Clarksville soils and with the Minvale soils. They occur in narrow V-shaped valleys along intermittent drains adjacent to the foot slopes that are occupied by these associated soils, and also on colluvial fans near the mouths of drains that extend from the cherty upland slopes. In position and in texture, Lobelville soils are similar to the local alluvium phases of the Huntington soils.

Typical profile in a disturbed area (Lobelville cherty silt loam, local alluvium phase):

0 to 13 inches, dark-brown (10YR 3/3 to 10YR 4/3) cherty silt loam; weak fine and medium granular structure; very friable; moderately to strongly acid; 10 to 24 inches thick; gradual wavy boundary.

13 to 23 inches, dark-brown (7.5YR 4/4) cherty silt loam; weak fine and medium granular structure; friable; strongly acid; 6 to 20 inches thick; gradual wavy boundary.

23 to 32 inches, brown (7.5YR 5/4) to yellowish-brown (10YR 5/4) cherty silty clay loam; weak and moderate medium subangular blocky structure; friable; strongly acid; 10 to 24 inches or more thick.

32 inches +, chert bed.

Range in characteristics: In some wooded areas the surface layer is dark grayish brown (10YR 4/2). The amount of chert varies widely from place to place, both on the surface and in the profile. A few areas have little or no chert. The depth of the colluvium ranges from 12 inches to more than 5 feet. Some areas are somewhat poorly drained. In these areas the layer that extends from 13 to 23 inches is brown (10YR 5/3) with medium, distinct mottles of light gray (10YR 7/2) and pale brown (10YR 6/3) and the layer that extends from 23 to 32 inches has more intense mottlings of the same colors.

Topography: Level to nearly level.

Drainage: Runoff is moderately slow to slow, and internal drainage is medium to moderately slow. Permeability is moderate to moderately slow.

Native vegetation: Mainly oak, hickory, maple, beech, and elm.

Lobelville cherty silt loam, local alluvium phase (0 to 2 percent slopes) (Ld) (Capability unit IIw–1).—As this is the only soil of this series mapped in the county, its characteristics and uses are given in the series description.

Melvin series

The Melvin series consists of poorly drained soils of the first bottoms. These soils were derived from materials

that washed from soils overlain chiefly by limestone but partly by sandstone and shale. These soils occur mainly along the Tennessee River, in Browns Valley, and in Cotaco Valley. They have high water-holding capacity. In places water stands on these soils for long periods. These soils are fertile, but they require adequate drainage to be fully productive.

Melvin soils are associated with the Egam-Newark soils, the Egam soils, and the Pope soils. They are more poorly drained than these associated soils. They are finer textured than the Pope soils and less acid.

Typical profile (Melvin silty clay loam):

0 to 12 inches, dark grayish-brown (10YR 4/2) silty clay loam; many, coarse, prominent mottles of gray (10YR 5/1), grayish brown (10YR 5/2), dark brown (10YR 3/3), black (10YR 2/1), and strong brown (7.5YR 5/8); much rounded concretionary material; weak medium and coarse granular structure; very friable; moderately to slightly acid; 6 to 12 inches thick; gradual boundary.

12 to 42 inches, gray (10YR 5/1) silty clay loam; many, coarse, prominent mottles of dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), dark brown (10YR 3/3), black (10YR 2/1), and strong brown (7.5YR 5/8); much rounded concretionary material; moderate medium subangular blocky and platy structure; friable to firm; moderately to slightly acid; 30 to 50 inches thick.

Range in characteristics: In places the surface soil is gray (10YR 5/1) to dark gray (10YR 4/1). The second layer in some areas is slightly plastic to plastic when wet. The amount of concretionary material varies, but it is plentiful throughout the profile. Some small scattered areas, in which the parent material was washed chiefly from sandstone, contain considerable sand throughout the profile.

Topography: Level to nearly level.

Drainage: Runoff, permeability, and internal drainage are slow.

Native vegetation: Mainly hardwoods, including sycamore, sweetgum, pin oak, and willow.

Melvin silt loam and silty clay loam (0 to 2 percent slopes) (Mb) (Capability unit IVw–3).—If these soils are adequately drained, they can be cultivated and will produce moderate yields. Pasture can be established if the soils are not drained, but drainage will improve the quality of the pasture. Included with these soils are some areas that have a silty clay texture from the surface to a depth of about 30 inches. Also included is a small acreage having a gray silt loam surface soil in cultivated areas and very dark grayish brown in wooded areas. The subsoil is friable light brownish gray (10YR 6/2) and has many, coarse, prominent mottles of gray (10YR 5/1) and yellowish brown (10YR 5/8). These included soils have been washed mainly from Fullerton and Clarksville soils.

Melvin fine sandy loam (0 to 2 percent slopes) (Ma) (Capability unit IVw–3).—Because more of the parent material of this soil than that of Melvin silt loam and silty clay loam was washed from sandstone, this soil is sandier throughout its profile. It is generally slightly more acid than Melvin silt loam and silty clay loam, and its permeability and internal drainage are slightly more rapid. This soil is less extensive than Melvin silt loam and silty clay loam, with which it is associated.

Minvale series

The Minvale series consists of well-drained soils that occur in the limestone valleys on the lower slopes below the chert ridges. These soils have developed from old colluvium derived from cherty limestone material. They contain chert fragments throughout the profile. They are low in fertility and, in some places, are severely eroded. Except for the severely eroded areas, these soils have a high water-holding capacity.

The Minvale soils are closely associated with the Fullerton, Fullerton-Clarksville, Allen-Waynesboro, and Cumberland and Hermitage soils. Except that they occur on dissimilar positions, they are similar to the Fullerton soils. They have a redder subsoil than that of the Clarksville soils. Their parent material is similar to that of the chert-free Cumberland and Hermitage soils, but their subsoil is lighter in color and coarser in texture. The Minvale soils are finer in texture than the Allen-Waynesboro soils, which were derived mainly from soils that developed from sandstone material.

Profile description (Minvale cherty silt loam, gently sloping phase):

A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) cherty silt loam; weak fine to medium granular structure; very friable; strongly acid; 1 to 3 inches thick; abrupt wavy boundary.

A_2 2 to 8 inches, grayish-brown (10YR 5/2) cherty silt loam; weak fine and medium granular structure; very friable; strongly acid; 6 to 10 inches thick; gradual boundary.

B_1 8 to 12 inches, yellowish-brown (10YR 5/6) cherty silt loam; weak coarse granular and weak fine subangular blocky structure; friable; strongly acid; 2 to 8 inches thick; gradual boundary.

B_{21} 12 to 24 inches, reddish-yellow (5YR 6/8) cherty silty clay loam; weak medium subangular blocky structure; friable; strongly acid; 8 to 18 inches thick; gradual boundary.

B_{22} 24 to 48 inches, yellowish-red (5YR 5/8 to 5YR 5/6) cherty silty clay; moderate medium subangular blocky structure; firm to friable; strongly acid; many feet deep.

Range in characteristics: A few small sandstone fragments occur in places. The surface soil is brown (10YR 5/3) in cultivated areas. The number and size of the chert fragments vary considerably throughout the profile. In places the subsoil is yellowish brown (10YR 5/4 to 10YR 5/6) and contains a large amount of chert. In some places the subsoil is slightly plastic and sticky when wet.

Topography: Gently sloping to sloping.

Drainage: Runoff is medium to rapid. Permeability is moderate, and internal drainage is medium.

Native vegetation: White oak, red oak, black oak, hickory, and dogwood.

Minvale cherty silt loam, gently sloping phase (2 to 6 percent slopes) (McB) (Capability unit IIe–1).—Mainly because this soil is gently sloping and its plow layer is relatively thick and easy to work, it is suitable for cultivation. Included is a small acreage where several inches of sandy material has mantled this soil. The texture of the surface layer of these inclusions is loam.

Minvale cherty silt loam, eroded gently sloping phase (2 to 6 percent slopes) (McB2) (Capability unit IIe–1).—This soil has a brown surface layer that is thinner and contains less organic matter than the surface layer of Minvale cherty silt loam, gently sloping phase. Tilth is poorer, and the soil is not so well suited to crops. Included is a small acreage where several inches of sandy material has mantled this soil. The texture of the surface layer of these inclusions is loam.

Minvale cherty silt loam, sloping phase (6 to 10 percent slopes) (McC) (Capability unit IIIe–1).—Because this soil

has stronger slopes and more rapid runoff than Minvale cherty silt loam, gently sloping phase, risks of erosion are greater and longer rotations are needed. Included is a small acreage where several inches of sandy material has mantled this soil. The texture of the surface layer of these inclusions is loam.

Minvale cherty silt loam, eroded sloping phase (6 to 10 percent slopes) (McC2) (Capability unit IIIe–1).—This soil has a browner and thinner plow layer than Minvale cherty silt loam, gently sloping phase. It also has stronger slopes and more rapid runoff. Because of these adverse factors, this soil needs longer crop rotations and more intensive management. Included is a small acreage where several inches of sandy material has mantled this soil. The texture of the surface layer of these inclusions is loam.

Minvale cherty silty clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (MdB3) (Capability unit IIIe–1).—Accelerated erosion has removed nearly all of the original surface soil. The present surface layer is reddish-yellow to yellowish-brown cherty silty clay loam (fig. 13). Mainly because of the clayey surface soil, generally poor tilth, and low moisture-holding capacity, this soil is not so suitable for crops as Minvale cherty silt loam, eroded gently sloping phase.

Minvale cherty silty clay loam, severely eroded sloping phase (6 to 10 percent slopes) (MdC3) (Capability unit IIIe–1).—This soil has lost all of its original A_1 and A_2 layers and part of the B_1 layer through accelerated erosion. The present plow layer is reddish-yellow to yellowish-brown cherty silty clay loam. This soil has much poorer tilth, slower permeability, and more rapid runoff than Minvale cherty silt loam, gently sloping phase, and it contains less organic matter. It is much less suited to crops. If row crops are grown on this soil, they should be planted only once in a 4- to 6-year rotation.

***Figure 13.*—Foreground—constructing terraces on Minvale cherty silty clay loam, severely eroded gently sloping phase. Background—Stony colluvial land, Allen soil material, and Rockland, sandstone.**

Monongahela series

The Monongahela series consists of deep, moderately well drained soils that have a fragipan. These soils occur on old alluvium on low stream terraces in the valleys. The alluvium was washed chiefly from sandstone, but it was influenced by limestone and shale. These inextensive soils occur mainly in Paint Rock Valley and, to some extent, in Browns Valley. The soils contain no stones. They are low in fertility, but they respond well to fertilizer. Because they are gently sloping, erosion is not a hazard. They have a fairly high water-holding capacity.

Monongahela soils are associated with the Tyler, Captina, and the Allen-Waynesboro soils. They are better drained than the Tyler soils and coarser textured than the Captina soils. They are less well drained and lighter in color than the Allen-Waynesboro soils.

Typical profile (Monongahela fine sandy loam, eroded gently sloping phase):

A_p 0 to 6 inches, brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

B_1 6 to 8 inches, brown (10YR 5/3) to yellowish-brown (10YR 5/4) heavy fine sandy loam to light fine sandy clay loam; weak medium granular and weak fine subangular blocky structure; friable; strongly acid; 1 to 6 inches thick; gradual boundary.

B_2 8 to 24 inches, yellowish-brown (10YR 5/4) fine sandy clay loam; weak fine and medium subangular blocky structure; friable; strongly acid; 8 to 24 inches thick; gradual wavy boundary.

B_{3m} 24 to 52 inches+, yellowish-brown (10YR 5/6) fine sandy clay loam; many, medium and coarse, distinct and prominent mottles of light gray (10YR 7/2) yellowish brown (10YR 5/8) and a few, medium, distinct mottles of strong brown (7.5YR 5/8); weak fine and medium subangular blocky structure; very strongly acid; many feet thick.

Range in characteristics: The surface soil ranges from a fine sandy loam to a very fine sandy loam. On the stronger slopes, the surface soil is dark brown (10YR 4/3) and the subsoil is strong brown (7.5YR 5/6). The texture of the subsoil varies from very fine sandy clay loam to clay loam and fine sandy clay. Normally where clay loam and fine sandy clay occur in the subsoil, the consistence is slightly plastic to plastic when wet and firm when moist. An area in Paint Rock Valley has a mantle of dark-brown (10YR 4/3) material that washed from Soda Top (Mountain). The depth to the fragipan ranges from about 14 to 30 inches but dominantly is from 18 to 26 inches.

Topography: Gently sloping.

Drainage: Surface runoff is medium. Permeability and internal drainage are moderately slow to slow.

Native vegetation: Dominantly hardwoods, such as oak and hickory; some shortleaf pine and loblolly pine.

Monongahela fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (MeB2) (Capability unit IIe–4).—Mainly because of its gentle slopes and good tilth, this soil is well suited to crops. Included are several uneroded areas that have a 1- to 2-inch A_1 layer of very dark grayish-brown to dark grayish-brown fine sandy loam. The A_2 layer is brown fine sandy loam, 6 to 8 inches thick.

Monongahela fine sandy loam, overwash phase (0 to 2 percent slopes) (Mf) (Capability unit IIw-1).—Sediments have been deposited on this soil recently. The surface layer is dark grayish-brown fine sandy loam, 1 to 8 inches thick. This soil is slightly acid to moderately acid and fertile. Because it is likely to be flooded, it is only fairly well suited to crops. This soil is suited to corn, but it is better suited to pasture and hay.

Montevallo series

The Montevallo series consists of soils of the limestone valleys that were derived from level-bedded, light-colored, noncalcareous shale. These soils occur mostly on the west side of Dividing Ridge. They are likely to be severely eroded. Most of the original surface soil has been removed, and gullies are common on nearly all of the acreage. These soils are low in water-holding capacity and in fertility.

Montevallo soils are closely associated with the Fullerton, the Fullerton-Clarksville, and the Tellico and Upshur soils. They differ in origin from the Fullerton-Clarksville soils, which were derived from chert. They are shallower than the Tellico and Upshur soils, which were derived from red shale.

Profile description of an inclusion of Montevallo shaly silt loam on 15 to 25 percent slopes.

A_1 0 to 1/4 inch, very dark-gray (10YR 3/1) shaly silt loam; weak fine and medium granular structure; very friable; moderately acid; 0 to 1 inch thick; abrupt smooth boundary.

A_2 1/4 to 2 inches, grayish-brown (2.5Y 5/2) shaly silt loam; weak fine to medium granular structure; very friable; moderately acid; 1 to 3 inches thick; gradual wavy boundary.

B_2 2 to 6 inches, brown (10YR 5/3) shaly silt loam; weak medium and fine subangular blocky structure; friable; strongly acid; 0 to 4 inches thick; gradual wavy boundary.

B_3 6 to 12 inches, yellowish-brown (10YR 5/4) shaly silt loam; weak fine and medium subangular blocky structure; friable; strongly acid; 1 to 6 inches thick; gradual wavy boundary.

C 12 inches+, olive (5Y 5/3) partly weathered shale that breaks into small, flat, platy fragments.

Range in characteristics: Most areas are shallower to the C horizon than the soil described. Near the Tellico and Upshur soils, the profile has a red (10R 4/8) silty clay loam B horizon at a depth of about 12 inches.

Topography: Moderately steep to steep.

Drainage: Runoff is very rapid. Permeability is slow to moderately slow.

Native vegetation: Mainly scrub pine with some white oak, red oak, post oak, and hickory.

Montevallo shaly silt loam, severely eroded steep phase (slopes greater than 25 percent) (MgF3) (Capability unit VIIe-1).—This soil is mainly in forest, for which it is probably best suited. Included with this soil are small areas that are practically uneroded. These inclusions are on slopes that range from 15 to more than 25 percent. Their profile is similar to that given in the series description. Also included are a few severely eroded areas on 15 to 25 percent slopes. These severely eroded inclusions have a 4- to 6-inch, yellowish-brown shaly silt loam surface soil overlying partially weathered shale.

Muskingum series

The Muskingum series consists of excessively drained soils that were derived from sandstone, sandstone conglomerate, and some shale. These soils occur on the Pottsville formation and Hartselle sandstone. The soils that occur on the coarser textured, sandier areas are only slightly eroded, but those that were derived from shale are likely to be more severely eroded. The fine sandy loams of this series are generally free of stones, but the stony fine sandy loam has sandstone outcrops in places. These soils are low in fertility and organic matter. They are also low in water-holding capacity.

Muskingum soils are closely associated with the Hartsells and Crossville soils. In places they occur with the Albertville soils. They are shallower to bedrock than their associated soils.

Profile description of an uneroded inclusion of Muskingum fine sandy loam on 6 to 10 percent slopes.

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2) to dark grayish-brown (10YR 4/2) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 0 to 2 inches thick; abrupt boundary.

A_2 1 to 8 inches, grayish-brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; strongly acid; 4 to 12 inches thick; gradual wavy boundary.

B 8 to 10 inches, yellowish-brown (10YR 5/4) fine sandy loam to light fine sandy loam; weak fine granular structure; very friable; contains some rock fragments or small stones; strongly acid; 1 to 4 inches thick; gradual wavy boundary.

C 10 to 14 inches, yellowish-brown (10YR 5/4) loamy sands; structureless (single grain); very friable; strongly acid; 2 to 20 inches thick; abrupt wavy boundary.

D 14 inches+, bedrock of acid sandstone.

Range in characteristics: The texture of the A horizon ranges from stony fine sandy loam to silt loam. The silt loam occurs as small scattered inclusions in all of the nonstony Muskingum soils. In places, normally adjoining Crossville soils, the surface layer is dark brown (10YR 4/3). Where the shale is the dominant parent material, the A horizon normally is eroded and the shaly silt loam B or C horizon is exposed. If a B horizon has developed, it may be as thick as 8 inches in some places. In places flat shale fragments make up about 25 to 50 percent of the material in the C horizon. The fragments are mixed with strong-brown (7YR 5/6) silt loam soil material. The depth to bedrock is only several inches in some places, but a few yards away the depth may be several feet. In some places the bedrock is weathered and fragmented, and in others it is practically solid.

Topography: Sloping and strongly sloping.

Drainage: Runoff is moderate to moderately rapid.

Native vegetation: Dominantly white oak, red oak, chestnut oak, hickory, and pine.

Muskingum fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (MhC2) (Capability unit VIe-1).—In places the surface soil is yellowish-brown fine sandy loam, 5 to 7 inches thick. Because it is shallow and sloping, this soil is not suited to crops. Under good management, pasture can be established on this soil, but a better use is for forest.

Included with this soil are a few severely eroded areas that have a yellowish-brown fine sandy loam surface layer, about 6 to 12 inches thick. This surface layer overlies a C horizon similar to that described for the series. Also included are a few small areas of severely eroded shallow Hartsells soil on 6 to 10 percent slopes. These Hartsells inclusions have a yellowish-brown fine sandy clay loam surface soil. Their B horizon is thicker than that of this soil, and their profile is 6 to 12 inches

deeper. These uneroded inclusions contain more organic matter than the rest of the soils of the Muskingum series.

Muskingum fine sandy loam, eroded strongly sloping phase (10 to 15 percent slopes) (MhD2) (Capability unit VIe–1).—In places this soil has a surface soil of yellowish-brown fine sandy loam, 5 to 7 inches thick. Mainly because it is shallow and strongly sloping, this soil is not suited to row crops. Although it is suited to hay crops, it is better suited to trees, particularly loblolly pine.

Included with this soil are small areas that are not materially eroded. These inclusions have profile characteristics like those described for the series. Also included are some severely eroded areas that have a 3- to 5-inch surface layer of yellowish-brown fine sandy loam. This surface layer overlies a C horizon like that of the uneroded Muskingum fine sandy loam described for the series. Other inclusions are a few small areas of severely eroded Hartsells soil. The Hartsells inclusion is 6 to 12 inches deeper than this soil, and it has a thicker B horizon than that described for the series.

Muskingum fine sandy loam, eroded moderately steep phase (15 to 25 percent slopes) (MhE2) (Capability unit VIe–1).—This soil is yellowish brown in areas where it was derived mainly from sandstone; it is strong brown where it was derived from shale. Because this soil is steep and thin, its best use is for forest. Included are small areas that are only slightly eroded and a few areas that are severely eroded.

Muskingum stony fine sandy loam, strongly sloping phase (10 to 15 percent slopes) (MkD) (Capability unit VIIe–2).—This soil has more sandstone fragments on the surface and in the profile than Muskingum fine sandy loam, eroded strongly sloping phase. It also has more sandstone outcrops. In a few places a weak B horizon has developed, but generally the 6- to 8-inch surface layer overlies partly weathered sandstone. Because it is strongly sloping, stony, and shallow, this soil is not suited to row crops, pasture, or hay. Its best use is for forest. Included with this soil are areas that have sloping relief.

Newark series

The Newark series consists of somewhat poorly drained soils on general alluvium and local alluvium. The soils that are on general alluvium occur on fine- and coarse-grained sediments that were washed from limestone, sandstone, and shale. These soils are on the first bottoms along the larger creeks of the limestone valleys. The soils that are on local alluvium occur in drainageways and swales. The Newark soils are widely distributed. They have a high water-holding capacity.

The Newark soils that are on general alluvium are associated with the Egam, Egam-Newark, and the Melvin soils. They differ from the Egam soils in being more poorly drained and coarser in texture. They are somewhat coarser in texture than the Egam-Newark soils. They are better drained than the Melvin soils.

Profile description (Newark fine sandy loam):

0 to 8 inches, dark grayish-brown (10YR 4/2) to dark-brown (10YR 4/3 to 10YR 3/3) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 6 to 10 inches thick; abrupt boundary.

8 to 20 inches, dark grayish-brown (10YR 4/2) loam to fine sandy loam with many, medium, distinct mottles of grayish brown (10YR 5/2), yellowish brown (10YR 5/4), dark reddish brown (5YR 4/3), yellowish red (5YR 5/6), and dark brown (7.5YR 4/4); weak fine platy and weak fine subangular blocky structure; friable; strongly acid; 6 to 18 inches thick; abrupt boundary.

20 to 44 inches, yellowish-brown (10YR 5/6) to grayish-brown (10YR 5/2) fine sandy loam to fine sandy clay loam; many, coarse, prominent mottles of yellowish red (5YR 5/6), strong brown (7.5YR 5/6), gray (10YR 5/1), very dark brown (10YR 2/2), and black (7.5YR 2/1); weak fine and medium platy and subangular blocky structure; friable; strongly acid; 10 to 30 inches thick.

Range in characteristics: The texture of the surface soil of Newark soils is loam, fine sandy loam, silt loam, or silty clay loam. Color and texture vary greatly throughout the profile. The areas that have a dark-brown surface soil generally are areas where the alluvium has been recently deposited. Pockets, lenses, or strata of sand to loamy sand commonly occur at various depths. In places the soils that are on local alluvium are as shallow to bedrock as 36 inches.

Topography: Nearly level to level.

Drainage: Runoff, permeability, and internal drainage are slow. Areas along creeks and rivers are subject to flooding.

Native vegetation: Mostly hardwoods, chiefly sycamore, sweetgum, willow, and beech; some pine.

Newark fine sandy loam (0 to 2 percent slopes) (Na) (Capability unit IIIw–1).—This soil is suited to crops and pasture; but because it is likely to be flooded at times, crops can be lost. Included with this soil are areas that have a surface soil of loam, silt loam, or silty clay loam.

Newark loam, local alluvium phase (0 to 2 percent slopes) (Nb) (Capability unit IIIw–1).—This soil is not subject to flooding. It is generally 24 to 26 inches of recent alluvium that overlies an older soil. The older soil is slowly permeable to water. Corn is the main crop grown, but pasture, whiteclover, and fescue are also grown.

Philo and Stendal series

The Philo soils and the Stendal soils are so closely intermingled or their boundaries are so indistinct that it is impractical to show them separately on the soil map. These soils occur together in swales and in long, narrow strips along drainageways. They are widely distributed on the plateaus. Their parent material has been washed from the Hartsells, Linker, Crossville, Albertville, Tilsit, and Muskingum soils. The Philo soils are moderately well drained, whereas the Stendal soils are somewhat poorly drained. The soils of both series have a high water-holding capacity. They are low in fertility but respond well to fertilizer.

Profile description (Philo loam):

0 to 14 inches, very dark grayish-brown (10YR 3/2) loam; weak medium granular structure; very friable; strongly acid; 12 to 24 inches thick; gradual boundary.

14 to 34 inches, dark yellowish-brown (10YR 4/4) fine sandy clay loam; few, medium, faint mottles of dark brown (7.5YR 4/4); weak fine subangular blocky structure; strongly acid; 15 to 30 inches thick; gradual boundary.

34 to 38 inches, dark yellowish-brown (10YR 4/4) fine sandy clay loam; many, medium, distinct mottles of dark red (2.5YR 3/6), yellowish red (5YR 5/6), and dark brown (7.5YR 4/4); weak fine subangular blocky structure; friable; strongly acid; 2 to 8 inches thick; abrupt boundary.

38 inches, sandstone bedrock.

Range in characteristics of the Philo soils: The texture of the surface soil ranges from fine sandy loam to silt loam. In places a few faint mottles of brown occur in

the surface layer. The color of the surface soil is dark grayish brown (10YR 4/2) in places. Gravel occurs on the surface and throughout the soil, especially in areas on the western side of Brindley Mountain. Stratified layers of loamy sand occur in places.

Topography: Nearly level to level.

Drainage: Runoff is slow, and permeability and internal drainage are moderately slow.

Native vegetation: Hickory, poplar, white oak, red oak, post oak, and dogwood.

Profile description (Stendal loam):

0 to 6 inches, dark grayish-brown (10YR 4/2) loam with common, faint, fine and medium mottles of grayish brown (10YR 5/2) and yellowish brown (10YR 5/4); weak medium granular structure; very friable; strongly acid; 6 to 10 inches thick; gradual boundary.

6 to 20 inches, dark grayish-brown (10YR 4/2) loam; many, medium, distinct mottles of grayish brown (10YR 5/2), yellowish brown (10YR 5/4), and dark reddish brown (5YR 4/3); weak fine platy and weak fine subangular blocky structure; friable; strongly acid; 10 to 20 inches thick; abrupt boundary.

20 to 44 inches, yellowish-brown (10YR 5/6) fine sandy clay loam; many, medium and coarse, prominent mottles of yellowish red (5YR 5/6), strong brown (7.5YR 5/6), and grayish brown (10YR 5/2); weak fine and medium platy and subangular blocky structure; friable; strongly acid; 12 to 30 inches thick; abrupt boundary.

44 inches, sandstone bedrock.

Range in characteristics of the Stendal soils: The surface texture ranges from fine sandy loam to silt loam. Many textures occur throughout the profile. In places there are strata of sand.

Topography: Nearly level to level.

Drainage: Runoff, permeability, and internal drainage are slow.

Native vegetation: Sycamore, sweetgum, willow, and beech; some pine.

Philo and Stendal soils, local alluvium phases (2 to 6 percent slopes) (Pa) (Capability unit IIw–1).—These soils need to be drained if they are used for crops. Without being drained, they can grow fair to good pasture. Included with this mapping unit are areas having an 8- to 10-inch grayish-brown (10YR 5/2) to dark grayish-brown (10YR 6/4) fine sandy clay loam subsoil over a fragipan at a depth ranging from 12 to 18 inches.

Pope series

The Pope series consists of well-drained soils of the plateaus that occur in general alluvium on the first bottoms. This alluvium has been washed from the Hartsells, Linker, Crossville, Albertville, Tilsit, and Muskingum soils. It is sandy material that has been altered only slightly. The Pope soils have a high water-holding capacity. They are medium to high in productivity and have a wide range of crop suitability. The Pope soils are associated with the Atkins soils and the Philo and Stendal soils. They are browner and better drained than are these associated soils.

Typical profile (Pope fine sandy loam):

0 to 8 inches, dark-brown (10YR 4/3) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 6 to 20 inches thick; gradual boundary.

8 to 36 inches, dark-brown (7.5YR 3/2) to very dark brown (10YR 2/2) fine sandy loam to very fine sandy loam; weak coarse granular structure; very friable; strongly acid; 20 to 30 inches thick; gradual to abrupt boundary.

36 to 48 inches, dark-brown (7.5YR 3/2) very fine sandy clay loam; weak coarse granular structure; friable; strongly acid; many feet deep.

Range in characteristics: In places strata of sand or loamy sand occur at various depths. Loose stones, mostly sandstone and chert, occur in places at the bottom of steep slopes.

Topography: Level to nearly level.

Drainage: Runoff is moderately slow to slow. Permeability is moderate, and internal drainage is medium.

Native vegetation: Mixture of pines and deciduous trees, including oak, pine, poplar, and willow.

Pope fine sandy loam (0 to 2 percent slopes) (Pb) (Capability unit IIw–2).—This soil has excellent tilth, is easily worked, and has good moisture-holding capacity. It is low in fertility but responds well to fertilizer. The main hazard is periodic stream overflow. Included with this soil are areas that have a very fine sandy loam surface soil. Also included are areas along Slab Creek on Sand Mountain that have a silt loam surface soil.

Purdy series

The Purdy series consists of deep, poorly drained soils on old stream terraces in the limestone valleys. These inextensive soils occur mainly in Paint Rock Valley. They have developed from old alluvium that was washed from residuum of sandstone, limestone, and shale. The water table is high, and water stands for long periods. Erosion is no problem on these level and nearly level soils. No stones occur on the surface or in the profile. These soils are low in fertility but, if they are adequately drained and fertilized, grasses grow well.

Purdy soils are associated with the Tyler, Monongahela, and Robertsville soils. They are more poorly drained than the Monongahela soils and are coarser textured and more acid than the Robertsville soils.

Typical profile in a disturbed area (Purdy fine sandy loam):

A 0 to 8 inches, gray (10YR 5/1) fine sandy loam; weak medium granular structure; very friable; strongly acid; 8 to 12 inches thick; abrupt wavy boundary.

B_1 8 to 14 inches, pale-brown (10YR 6/3) to very pale brown (10YR 7/4) fine sandy clay loam; few, fine, faint mottles of gray (10YR 5/1); weak fine and medium subangular blocky structure; friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

B_{21} 14 to 24 inches, pale-brown (10YR 6/3) very fine sandy clay to clay loam; many, coarse, prominent mottles of gray (10YR 6/1), yellowish red (5YR 5/6), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6); moderate coarse subangular blocky structure; friable to firm; strongly acid; 8 to 15 inches thick; gradual wavy boundary.

B_{22} 24 to 48 inches, gray (10YR 6/1) clay loam; many, coarse, prominent mottles of yellowish red (5YR 5/6) and strong brown (7.5YR 5/6); moderate to coarse subangular blocky structure to structureless (massive); firm to extremely firm; strongly acid; many feet deep.

Range in characteristics: The texture of the subsoil varies greatly but is dominantly quite clayey. In a few places the clayey subsoil occurs at a depth of 30 inches.

Topography: Level to nearly level.

Drainage: Runoff, permeability, and internal drainage are slow.

Native vegetation: Beech, hickory, poplar, and pin oak.

Purdy fine sandy loam (0 to 2 percent slopes) (Pc) (Capability unit IVw–3).—Because of the clayey subsoil and wetness, this soil is not suited to crops. If it is adequately drained and fertilized, it produces fair to good pasture. Included are some areas that have a very fine sandy loam surface soil.

Robertsville series

In the Robertsville series are poorly drained soils that have developed on low stream terraces in the limestone valleys. The largest area of these inextensive soils occupies nearly 1 square mile in Paint Rock Valley adjoining Jackson County. Smaller areas occur in Browns Valley. These soils were developed mainly from sediments that were washed from limestone soil material. They have a high water table, even in periods of normal rainfall. They are likely to be flooded at times. Their water-holding capacity is low, and they are only moderately fertile.

Robertsville soils are closely associated with the Tupelo, Taft, Captina, and Monongahela soils. They are more poorly drained and have a finer textured surface soil than these associated soils. Their subsoil is finer textured than that of the Taft, Captina, and Monongahela soils. It is coarser textured and less plastic than the subsoil of the Tupelo soils.

Typical profile in an undisturbed area (Robertsville silty clay loam):

A_1 0 to 2 inches, dark-gray (10YR 4/1) silty clay loam; weak coarse granular structure; many rounded concretions; friable; moderately acid; 1 to 4 inches thick; abrupt wavy boundary.

A_2 2 to 12 inches, grayish-brown (10YR 5/2) silty clay loam; many, coarse, distinct and prominent mottles of gray (10YR 5/1) and dark brown (10YR 4/3); weak coarse granular structure; many rounded concretions; friable; moderately acid; 8 to 12 inches thick; abrupt wavy boundary.

B_{21} 12 to 25 inches, strong-brown (7.5YR 5/6) clay; many, coarse, prominent mottles of light brownish gray (10YR 6/2), gray (10YR 6/1), light yellowish brown (10YR 6/4), and yellowish red (5YR 4/8); many rounded concretions; structureless (massive); extremely firm when moist, very plastic when wet, and extremely hard when dry; moderately acid; 10 to 20 inches thick; diffuse boundary.

B_{22} 25 to 48 inches, gray (10YR 6/1) clay; many, coarse, prominent mottles of light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), light yellowish brown (10YR 6/4), and yellowish red (5YR 4/8); many rounded concretions; extremely firm when moist, very plastic when wet, and extremely hard when dry; moderately acid; many feet thick.

Range in characteristics: The texture of the surface soil ranges from silt loam to light silty clay. In cleared areas, the surface soil is light gray (10YR 7/1).

Topography: Nearly level to level.

Drainage: Runoff is slow. Permeability and internal drainage are very slow.

Native vegetation: Beech, sycamore, birch, hickory, and pin oak.

Robertsville silty clay loam (0 to 2 percent slopes) (Ra) (Capability unit IVw–3).—Because it is poorly drained and clayey, this soil is not suited to crops. If adequately drained and fertilized, it is fairly well suited to pasture plants and to grasses for hay. Although mapped as a silty clay loam, this mapping unit has inclusions that have a surface soil as coarse textured as silt loam and as fine textured as silty clay.

Rockland, limestone

Rockland, limestone, occurs chiefly on the lower third of the steep mountain slopes and in the limestone valleys. The largest areas are in Kennamer Cove. This land type has many limestone outcrops and boulders. It is associated with Stony smooth land, limestone, from which it differs in having a much larger part of its area in outcrops.

One side of the outcrops of Rockland, limestone, generally projects 10 to 36 inches above the soil material, whereas the other side is at the surface. In places the outcrops form perpendicular walls or escarpments. Between the outcrops and boulders is residuum from weathered limestone and, in places, residuum from shale that occurs in thin layers in the limestone. Most of this soil material is compact, sticky, heavy clay that is similar to the subsoil of the Colbert soils. The surface layer is nearly black in places. This soil material is as deep to bedrock as 2 to 3 feet. In most places the outcrops cover more than 50 percent of the surface, but on some of the less strongly sloping benches they cover about 20 percent. Sinks are common in all areas. This land type has rapid runoff. The soil material is very slowly permeable. It is low in water-holding capacity. Most of the land is in cedar mixed with hardwoods and pine.

Rockland, limestone (Rb) (Capability unit VIIe–2).—This land has so many limestone outcrops and boulders that cultivation is impractical. Most of its slopes are steeper than 10 percent, but some are 4 to 10 percent. The areas with slopes of less than 10 percent are in Kennamer Cove and Click Hollow.

Included with this land is a small acreage of very cherty land. More than half the material of this inclusion consists of chert fragments. Most of the fragments are less than 4 inches in diameter, but a few are much larger. Mixed with this chert is a grayish or yellowish soil material that is similar to the surface layer of Clarksville soils. All of this cherty land is on the narrow crest of chert ridges above areas of Fullerton and Clarksville soils. This cherty inclusion is covered with a scrubby growth of hardwoods. It has little or no agricultural value.

Rockland, sandstone

Rockland, sandstone, is made up of rough stony areas that consist chiefly of sandstone and boulders. In some places shale rock is mixed with the sandstone. Slopes range from 6 to 40 percent, but the 15 to 40 percent slopes are dominant. Much of the steep area of this land consists of the upper fourth of the rough stony slopes that extend from the sandstone plateaus to the valleys. This area consists mainly of ledges and escarpments near the tops of mountains. The sandstone is 100 to 200 feet thick on most slopes.

Rockland, sandstone, is closely associated with Rockland, limestone, and with Stony colluvial land, Allen soil material. In many places these three land types are separated on the map by arbitrary boundaries.

Runoff is rapid on the steep slopes, but it is somewhat less rapid on the moderate slopes. In places the runoff disappears into sinks that have outlets in underground channels. Because of the rock, there is little internal drainage. This land type has low water-holding capacity. It is strongly acid and low in fertility. This land is mostly in hardwoods. The forest is mainly hardwoods intermingled with a few scattered pines. The trees protect this land and, even on the steep slopes, little erosion occurs in the forested areas.

Rockland, sandstone (15 to 25 percent slopes) (Rc) (Capability unit VIIe–2).—This land is not suited to crops, and areas cleared for pasture soon become gullied. Included in this mapping unit are some areas of Stony

colluvial land, Allen soil material, and Rockland, limestone. Also included are areas on 6 to 25 percent slopes that have only a few rock outcrops but have many loose stones on the surface. Other inclusions are small areas of Hartsells, Linker, and Crossville soils.

Sandy alluvial land, excessively drained

Sandy alluvial land, excessively drained, consists of very sandy general alluvium and local alluvium. It occurs inextensively in the limestone valleys, mostly in small areas adjacent to the stream channels. It is low in plant nutrients, organic matter, and moisture-holding capacity. Because it contains little clay, plant nutrients are readily leached. It is associated with soils of the bottom lands.

Typical profile in a disturbed area (Sandy alluvial land, excessively drained):

0 to 18 inches, dark-brown (10YR 4/3) loamy sand; structureless (single grain) and very fine granular structure; very friable; strongly acid; 12 to 36 inches thick; gradual wavy boundary.

18 to 40 inches +, dark yellowish-brown (10YR 4/4) loamy sand; structureless (single grain) and very fine granular structure; very friable; very strongly acid; 6 to 40 inches thick.

Range in characteristics: The color of the surface soil ranges from brown (10YR 5/3) to yellowish brown (10YR 5/4). In places the profile is pale brown (10YR 6/3) from a depth of 18 inches to 30 inches and is very pale brown (10YR 7/3) below 30 inches. The lighter colored areas normally consist of local alluvium near the foot of the sandstone mountains. In places lenses of sand occur at a depth of 24 inches or more.

Topography: Level to nearly level.

Drainage: Surface runoff is very slow. Permeability and internal drainage are very rapid.

Vegetation: White oak, black oak, willow, beech, and birch.

Sandy alluvial land, excessively drained (0 to 2 percent slopes) (Sa) (Capability unit IIw–2).—Most of this mapping unit is in unimproved pasture; some is in deciduous forest. Productivity is low, but the better areas can be used for early potatoes and other early maturing crops.

Stony colluvial land, Allen soil material

Stony colluvial land, Allen soil material, consists mainly of material that rolled or was washed down the steep slopes of mountains. This land type generally occupies the middle portion of steep slopes from a point one-fourth the distance from the top of the mountain to a point one-fourth the distance from the bottom. In places it extends to the bottom of steep slopes. Large boulders are on the surface and throughout the soil material. The boulders are as much as 20 to 30 inches in diameter. They vary in size and number from place to place. Limestone outcrops occur in places, but the soil material between the outcrops was derived mainly from sandstone and shale.

Stony colluvial land, Allen soil material, is associated with Rockland, sandstone, and Rockland, limestone. In many places these three land types are separated on the soil map by arbitrary boundaries.

Runoff is rapid on this land type, but, because of the forest cover, erosion is slight. In places the runoff flows into sinks that have outlets in underground channels. This water flows through the underground channels and reappears as springs farther down the slope or in the valley. In places these outlets are a great distance from the sinks. Where the soil material is deep over bedrock, permeability is moderate and internal drainage is medium.

The water-holding capacity is moderate. A forest of mixed hardwoods covers this land type. The dominant trees are white oak, red oak, black oak, chestnut oak, and hickory.

Stony colluvial land, Allen soil material (25+ percent slopes) (Sb) (Capability unit VIIe–2).—This land type has no agricultural value and should be kept in forest. In places Rockland, sandstone, and Rockland, limestone, are included.

Stony smooth land, limestone

Stony smooth land, limestone, generally occurs below and adjacent to Rockland, limestone, but it also occurs elsewhere in the limestone valleys. This land has many outcrops of limestone. The soil material between the outcrops is very sticky and plastic when wet. It is similar to that of the Colbert soils. The surface layer is reddish-brown to yellowish-brown silty clay or clay. The underlying layer is yellowish-brown to red clay. Runoff is rapid. Because of the clayey soil material and the shallow depth to bedrock, the water-holding capacity and fertility are low. Reaction is strongly acid.

This land type is in pasture and forest. It is well suited to these uses. If properly fertilized, whiteclover and fescue grow well. The dominant trees are cedar; there is some white oak, red oak, and chestnut oak intermixed with a scattering of pine.

Stony smooth land, limestone (2 to 10 percent slopes) (Sc) (Capability unit VIe–4).—Dominant slopes range from 2 to 6 percent. Because the rock outcrops occur at such close intervals, this land type is not suited to crops. It is, however, suited to pasture.

Taft series

The Taft series consists of deep, somewhat poorly drained soils that have a fragipan. These soils have developed from old alluvium on low terraces. The parent material was washed from soils that were derived mainly from limestone but partly from shale and sandstone. Taft soils are widely distributed on gently rolling areas in the limestone valleys. They are likely to be flooded occasionally. They are low in fertility, but they respond well to fertilizer. Normally no stones occur on or in these soils. They have a fairly low water-holding capacity.

Taft soils are associated mainly with the Captina soils and, to a lesser extent, with the Tyler and Tupelo soils. They are more poorly drained than the Captina soils. They are finer textured than the Tyler soils and are coarser textured than the Tupelo soils.

Typical profile in a disturbed area (Taft silt loam):

A 0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; a few, fine, faint mottles of yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4); weak fine and medium granular structure; black concretionary material common; very friable; strongly acid; 4 to 12 inches thick; abrupt wavy boundary.

B_1 8 to 11 inches, brown (10YR 5/3) silty clay loam; faint, fine mottles of yellowish brown (10YR 5/4); weak medium subangular blocky structure; black concretionary material common; friable; strongly to very strongly acid; 2 to 8 inches thick; gradual wavy boundary.

B_{2m1} 11 to 15 inches (pan), yellowish-brown (10YR 5/4 to 10YR 5/6 or 10YR 5/8) silty clay loam; common, medium, distinct mottles of light gray (10YR 7/2) and yellow (10YR 7/6); weak medium and coarse subangular blocky structure; much black concretionary material; friable; very strongly acid; 2 to 8 inches thick; gradual wavy boundary.

B_{2m2} 15 to 22 inches (pan), yellowish-brown (10YR 5/4 to 10YR 5/6) silty clay loam; many, medium, prominent mottles of light gray (10YR 7/2), very pale brown (10YR 7/3), and red (2.5YR 4/8); weak medium and fine subangular blocky structure; much black concretionary material; friable; very strongly acid; 4 to 10 inches thick; gradual wavy boundary.

B_{2m3} 22 to 40 inches (pan), light yellowish-brown (10YR 6/4) silty clay loam; many, coarse, prominent mottles of gray (10YR 7/1), yellowish brown (10YR 5/6), strong brown (7.5YR 5/8), and red (2.5YR 4/8); moderate medium angular and subangular blocky structure; much black concretionary material; friable; very strongly acid; many feet thick in places.

Range in characteristics: The color of the surface soil ranges from grayish brown (10YR 5/2) to brown (10YR 5/3). An area in Cotaco Valley is moderately acid and has chert fragments on the surface and throughout the profile. The depth to the pan ranges from about 6 to 18 inches.

Topography: Level to gently sloping.

Drainage: Runoff is slow on level areas and moderately rapid on some gently sloping areas. Permeability and internal drainage are slow.

Native vegetation: White oak, red oak, post oak, hickory, and poplar.

Taft silt loam, level phase (0 to 2 percent slopes) (TaA) (Capability unit IIIw–2).—Because this soil is poorly drained and likely to be flooded at times, it is not well suited to crops. It is much better suited to pasture grasses. Included with this soil in Paint Rock Valley is Taft silt loam, overwash phase. This inclusion is subject to frequent overflow and generally has 2 to 12 inches of silt loam over its old original surface soil. This layer is slightly acid to moderately acid and more fertile than the underlying layers.

Taft silt loam, eroded gently sloping phase (2 to 6 percent slopes) (TaB2) (Capability unit IIIe–4).—This soil has a brown to yellowish-brown surface layer. Its fragipan is normally within 10 inches of the surface. It contains less organic matter than Taft silt loam, level phase, and has more rapid runoff. This soil is not well suited to crops, partly because the pan retards the movement of air and water and restricts the growth of roots. It is better suited to grasses for pasture and hay.

Tellico and Upshur series

The Tellico and Upshur soils are so closely associated that it is not practical to show them separately on the soil map. These soils occur together on many of the hilly and steep slopes on the west side of Dividing Ridge in the limestone valleys. The Tellico soils are well drained. They have developed over interbedded shale, sandstone, and limestone that consisted mostly of shale. The Upshur soils are moderately well drained. They have developed over limestone. The Tellico and Upshur soils are low in fertility and, in places, are severely eroded.

The Tellico and Upshur soils are associated with the Alcoa soils, which were developed from old colluvium that was washed or rolled from these soils. These soils are generally shallower than the Alcoa soils. They are also associated with the Fullerton-Clarksville soils that occur on both sides of Dividing Ridge. They differ from the Fullerton-Clarksville soils in being browner and in having no chert.

Profile in a disturbed area (Tellico silt loam):

A_p 0 to 5 inches, dark-brown (7.5YR 3/2) silt loam; weak medium granular structure; very friable; strongly acid; 4 to 7 inches thick; abrupt boundary.

B_1 5 to 12 inches, dark reddish-brown (5YR 3/3) silty clay loam; weak coarse granular and weak fine subangular blocky structure; friable; strongly acid; 4 to 8 inches thick; gradual wavy boundary.

B_2 12 to 42 inches, dark reddish-brown (5YR 3/3) silty clay loam to silty clay; moderate medium subangular blocky structure; friable; strongly acid; 1 to 6 feet thick.

Range in characteristics of Tellico soils: The texture of the surface soil ranges from silt loam to loam. The texture of the subsoil ranges from a clay loam to a silty clay. The soils that contain more clay are generally deeper to bedrock. The loams are about 24 to 30 inches deep to sandstone. In places sandstone rock outcrops occur. The color of the subsoil is reddish brown (5YR 4/3) in places.

Topography: Strongly sloping to steep.

Drainage: Runoff is rapid, permeability is moderate, and internal drainage is medium.

Native vegetation: Loblolly pine, shortleaf pine, hickory, white oak, red oak, and a few cedars.

Typical profile in a disturbed area (Upshur silty clay loam):

A_1 0 to 1 inch, dark reddish-brown (5YR 2/2) silty clay loam; moderate fine subangular blocky structure; friable; moderately acid; 1 to 2 inches thick; abrupt wavy boundary.

B_1 1 to 5 inches, dark reddish-brown (2.5YR 3/4) silty clay; strong medium subangular blocky structure; friable; moderately acid; 2 to 6 inches thick; gradual wavy boundary.

B_{22} 5 to 22 inches, dark reddish-brown (2.5YR 3/4) clay; strong medium subangular blocky structure; firm; slightly acid; 15 to 25 inches thick; gradual wavy boundary.

B_{23} 22 to 32 inches, weak-red (2.5YR 4/2) clay; common, medium, faint and distinct mottles of dark brown (7.5YR 4/4); strong medium subangular blocky structure; extremely firm; slightly acid to neutral; 4 to 12 inches thick; gradual wavy boundary.

B_3 32 to 36 inches, dark yellowish-brown (10YR 4/4) clay; common, medium, distinct mottlings of dark brown (10YR 4/3); strong medium subangular blocky structure; extremely firm; slightly acid to slightly alkaline; 2 to 6 inches thick; some clay skins and manganese coatings; abrupt wavy boundary.

Range in characteristics of Upshur soils: The depth to bedrock ranges from 1 to 3 feet. Rock outcrops occur in places.

Topography: Strongly sloping to steep.

Drainage: Runoff is rapid. Permeability and internal drainage are slow to moderately slow.

Native vegetation: White oak, red oak, hickory, and cedar.

Tellico and Upshur soils, eroded strongly sloping phases (10 to 15 percent slopes) (TbD2) (Capability unit VIe–1).—Because of its strong slopes, relatively shallow depth to bedrock, rapid runoff, and poor tilth, these soils are poorly suited to crops. They are best used for pasture, hay, or forest.

Included in this mapping unit are some severely eroded areas of Tellico and Upshur soils. The Upshur soils of these inclusions have a firm dark reddish-brown silty clay loam surface layer. This layer has a strong medium

subangular blocky structure. The Tellico soils have a dark reddish-brown silty clay loam surface layer. This layer contains less organic matter than that of the severely eroded Upshur soils. It has a weak fine subangular blocky structure.

Tellico and Upshur soils, eroded moderately steep phases (15 to 25 percent slopes) (TbE2) (Capability unit VIIe–1).—These soils are closely associated with Tellico and Upshur soils, steep phases. Because of their moderately steep slopes and shallow depth to bedrock, they are better suited to forest than to crops or pasture.

Tellico and Upshur soils, steep phases (25+ percent slopes) (TbF) (Capability unit VIIe–1).—Because of the steep slopes, shallow depth to bedrock, and risk of erosion, these soils are best suited to trees.

Tilsit series

The Tilsit series consists of moderately well drained soils that have a fragipan. They have developed from interbedded sandstone and shale on the plateaus. They are widely distributed on Sand Mountain and Brindley Mountain. On Brindley Mountain they have developed mainly on sandstone parent material. These soils contain no stone or gravel. Even though they have a fragipan, they are fairly high in water-holding capacity. They are important to farming and are intensively cropped.

Tilsit soils occur in relative flat areas in association with the Hartsells and Albertville soils. They differ from the Hartsells soils in having a fragipan and a finer texture. They are lighter colored and coarser textured than the Albertville soils. On Sand Mountain the Tilsit soils have developed on a silty clay layer that is similar to the subsoil of the Albertville soils. These soils do not warm in spring as soon as their associated soils. Crop yields, however, are generally as high as they are on the Hartsells and Albertville soils.

Typical profile in an undisturbed area (Tilsit very fine sandy loam):

A_0 ¼ to 0 inch, black layer held in a mat of fine roots; extremely acid; ¼ to 2 inches thick; abrupt smooth lower boundary.

A_2 0 to 3 inches, grayish-brown (2.5Y 5/2 to 10YR 5/2) very fine sandy loam; weak fine granular structure; very friable; strongly acid; 2 to 7 inches thick; gradual wavy boundary.

A_3 3 to 8 inches, pale-brown (10YR 6/3) very fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 1 to 6 inches thick; gradual wavy boundary.

B_1 8 to 11 inches, yellowish-brown (10YR 5/4) very fine sandy loam; weak coarse granular and weak fine subangular blocky structure; friable; strongly acid; 2 to 6 inches thick; gradual wavy boundary.

B_2 11 to 24 inches, yellowish-brown (10YR 5/6) very fine sandy clay loam; weak medium and fine subangular blocky structure; friable; lower 1 to 2 inches more compact; strongly acid; 12 to 28 inches thick; abrupt wavy boundary.

B_{3m} 24 to 36 inches (fragipan), yellowish-brown (10YR 5/6) very fine sandy clay loam to fine sandy loam; common, medium, distinct mottles of light gray (10YR 7/2); moderate medium subangular blocky structure; firm in place; friable when crushed; strongly acid; 8 to 20 inches thick; abrupt boundary.

D 36 inches +, strong-brown (7.5YR 5/6), yellowish-red (5YR 4/8), or red (10R 4/8) silty clay to clay; moderate medium subangular blocky structure; firm to very firm; strongly acid shale soil material.

Range in characteristics: On Brindley Mountain most areas of Tilsit soils have a fine sandy loam A horizon and a B horizon of very fine sandy loam to light fine sandy clay loam. The B horizon overlies a light fine sandy loam fragipan. The fragipan overlies a C horizon of highly weathered acid sandstone parent material. The depth to the fragipan ranges from about 18 to 32 inches. On Merrill Mountain the surface soil is dark yellowish brown (10YR 4/4) to dark grayish brown (10YR 4/2), and in places the subsoil is olive brown (2.5Y 4/4). The depth to bedrock is generally less than on other mountains, and rock outcrops occur in places. In places the texture of the pan is coarser than that of the layers above.

Topography: Level to gently sloping.

Drainage: Runoff is medium to moderately slow. Permeability is slow to moderately slow in the subsoil. Internal drainage is moderately slow.

Native vegetation: White oak, red oak, chestnut oak, hickory, loblolly pine, and shortleaf pine.

Tilsit very fine sandy loam, gently sloping phase (2 to 6 percent slopes) (TcB) (Capability unit IIe–3).—Because of gentle slopes, good tilth, and other favorable features, this inextensive soil is well suited to crops. The fragipan, however, limits the root zone and lowers the water-holding capacity. Therefore, this soil is not so well suited to crops as the associated Hartsells soils. This soil is closely associated with Tilsit very fine sandy loam, eroded gently sloping phase. Some included areas have slopes of 1 to 2 percent.

Tilsit very fine sandy loam, eroded gently sloping phase (0 to 2 percent slopes) (TcB2) (Capability unit IIe–3).—This is the most extensive soil of the Tilsit series (fig. 14).

Figure 14.—Cotton growing on Tilsit very fine sandy loam, eroded gently sloping phase. In some years the yields are low on this soil because it warms late in spring.

Because 4 to 6 inches of the original surface layer has been removed by erosion, the fragipan is generally only 18 inches below the surface. The root zone is generally more limited than that of Tilsit very fine sandy loam, gently sloping phase, and the water-holding capacity is lower. This soil has a yellowish-brown, 6- to 8-inch surface layer that is low in organic matter.

Tupelo series

The Tupelo series consists of somewhat poorly drained soils on old colluvial and terrace positions in the limestone valleys. These soils occur mainly in Kennamer Cove and Paint Rock Valley. They were derived primarily from

sediments that washed from soils overlying limestone material. These soils are moderately low in fertility and in water-holding capacity. Some low areas are likely to be flooded.

At the lower elevations Tupelo soils are associated with the Captina, Taft, and Robertsville soils, and at slightly higher elevations they occur with the Colbert soils. Their subsoil is finer textured than that of the Captina and Taft soils, and they are more poorly drained than the Captina soils. They are better drained than the Robertsville soils and more poorly drained and more friable than the Colbert soils.

Typical profile (Tupelo silt loam, eroded gently sloping phase):

AB_p 0 to 5 inches, dark-brown (10YR 4/3) silt loam; common, medium, faint mottles of yellowish brown (10YR 5/6); weak medium subangular blocky structure; black concretions common; friable when moist, slightly sticky when wet; slightly to strongly acid; 4 to 7 inches thick; abrupt wavy boundary.

B_2 5 to 14 inches, yellowish-brown (10YR 5/8) silty clay; many, medium, distinct mottles of light gray (10YR 7/2) and red (2.5YR 4/8); weak medium subangular and angular blocky structure; black concretionary material common; friable when moist, slightly sticky when wet; slightly to strongly acid; 4 to 12 inches thick; gradual wavy boundary.

B_{3m1} 14 to 24 inches, yellowish-brown (10YR 5/8) clay; many, coarse, prominent mottles of light gray (10YR 7/2) and red (2.5YR 4/8); moderate coarse subangular blocky structure and structureless (massive); black concretions common; firm when moist, sticky and plastic when wet; slightly to strongly acid; 6 to 18 inches thick; diffuse boundary.

B_{3m2} 24 to 41 inches +, yellowish-brown (10YR 5/8) clay; many, coarse, prominent mottles of light gray (10YR 7/1), red (2.5YR 4/8), and brownish yellow (10YR 6/8); structureless (massive); very firm when moist, very sticky and very plastic when wet; slightly to strongly acid; many feet thick.

Range in characteristics: In areas next to Rockland, limestone, these soils are slightly acid to alkaline. In other places they are strongly acid. Rock outcrops occur in a few places. In areas next to knobs of Rockland, limestone, some chert and limestone fragments occur on the surface.

Topography: Nearly level to gently sloping.

Drainage: Runoff is moderately rapid on undulating relief and slow on level relief. Permeability and internal drainage are slow.

Native vegetation: Chiefly cedar, post oak, red oak, and hickory.

Tupelo silt loam, level phase (0 to 2 percent slopes) (TdA) (Capability unit IIIw–2).—This soil has a dark grayish-brown surface layer, 6 to 8 inches thick. It contains more organic matter than Tupelo silt loam, eroded gently sloping phase, and its runoff is less rapid. Partly because of its fairly thin surface layer, poor drainage, and plastic clay subsoil, this soil is not suited to row crops. It is better suited to pasture and hay.

Tupelo silt loam, eroded gently sloping phase (2 to 6 percent slopes) (TdB2) (Capability unit IIIe–4).—This soil has a surface layer that is only 4 to 5 inches thick and a subsoil of plastic clay. Tilth is generally poor. Although its drainage and moisture-holding capacity are slightly higher than those of Tupelo silt loam, level phase, the risk of erosion is greater on this soil. This soil is better suited to pasture and hay than to row crops.

Tupelo silt loam, overwash phase (2 to 4 percent slopes) (Te) (Capability unit IIIw–1).—This soil occurs in Paint Rock Valley. It has 4 to 12 inches of silt loam that has been deposited on the original surface. The overwash layer is slightly acid and relatively fertile. This soil has better tilth and is easier to work than Tupelo silt loam, level phase. Because it is likely to be flooded, it is better suited to pasture and hay than to row crops.

Included with this soil is an area in Paint Rock Valley below Soda Top (Mountain) that has a fine sandy loam surface soil. Apparently the sandy material has been washed off the mountain. A few areas of Tupelo silt loam, overwash phase, are on 0 to 2 percent slopes. These areas are more poorly drained than the gently sloping areas.

Tupelo silty clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (TfB3) (Capability unit IVe–1).—All of the original surface layer of this soil has been removed through erosion. A few gullies occur. The present surface layer, 5 to 7 inches thick, is yellowish-brown silty clay loam. The underlying material is plastic clay. This soil is not suited to crops. It is better suited to hay and pasture.

Tyler series

The Tyler series consists of somewhat poorly drained soils that have developed from old alluvium on low terraces in the limestone valleys. These soils have developed from material washed from soils that were derived mainly from sandstone but partly from limestone and shale. These soils are inextensive and occur mostly in Paint Rock Valley and, to some extent, in Browns Valley. They have a high water table during wet periods. Because they are nearly level, they are not likely to erode. They contain no stones. These soils are low in fertility but respond well to fertilization. They have low moisture-holding capacity.

Tyler soils are associated with the Monongahela soils and, to some extent, with the Taft and Robertsville soils. They are more poorly drained than the Monongahela soils. They contain more sand than the Taft and Robertsville soils and are better drained and more acid than the Robertsville soils.

Typical profile in an undisturbed area (Tyler fine sandy loam):

A_1 0 to 2 inches, dark grayish-brown (10YR 4/2) to very dark grayish-brown (10YR 3/2) fine sandy loam; weak fine and medium granular structure; very friable; strongly acid; 1 to 4 inches thick; abrupt wavy boundary.

A_2 2 to 12 inches, grayish-brown (10YR 5/2) fine sandy loam; few, fine, faint mottles of light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6); weak medium and coarse granular structure; very friable; strongly acid; 6 to 10 inches thick; gradual wavy boundary.

B_1 12 to 16 inches, grayish-brown (10YR 5/2) fine sandy clay loam; few, fine, faint mottles of light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6); weak fine and medium subangular blocky structure; friable; strongly acid; 2 to 6 inches thick; gradual wavy boundary.

B_2 16 to 48 inches, yellowish-brown (10YR 5/6) fine sandy clay loam; many, coarse, prominent mottles of strong brown (7.5YR 5/6), light brownish gray (10YR 6/2), and gray (10YR 6/1); moderate medium subangular blocky structure; friable; strongly acid; many feet thick; the gray (10YR 6/1) increases with depth.

Range in characteristics: The texture of the subsoil ranges from a very fine sandy clay loam to clay loam. In places the consistence is firm if the soils are moist

and plastic if they are wet. In some areas, the surface soil is grayish brown (10YR 5/2) with a few, fine, faint mottles of brown (10YR 5/3), and the B_1 layer is pale brown (10YR 6/3) with common, fine, distinct mottles of yellowish brown (10YR 5/6) and strong brown (7.5YR 5/8).

Topography: Level to nearly level.

Drainage: Runoff, permeability, and internal drainage are slow.

Native vegetation: Oak, beech, hickory, poplar, and some loblolly pine and shortleaf pine.

Tyler fine sandy loam (0 to 2 percent slopes) (Tg) (Capability unit IIIw–2).—Because of its poor drainage and generally unfavorable physical condition, this soil is not suited to crops. It is better suited to pasture and hay. Included are areas that have a very fine sandy loam surface layer.

Wolftever series

The Wolftever series consists of moderately well drained soils that occur on low stream terraces along the Tennessee River. The parent materials of these soils were derived mostly from limestone, but they contained some materials that were derived from shale, sandstone, and metamorphic and igneous rocks. These soils are moderately eroded. They are likely to be flooded. They have a fairly high water-holding capacity. They are relatively low in fertility but respond well to fertilizer.

Wolftever soils are associated with the Egam soils on the first bottoms and with the Captina and Taft soils on low stream terraces. Unlike the younger Egam soils, the Wolftever soils have a B horizon. They differ from the Captina and Taft soils in being better drained and in not having a pan.

Typical profile (Wolftever silt loam, eroded gently sloping phase):

A_p 0 to 5 inches, dark-brown (7.5YR 4/4 to 10YR 4/3) silt loam; weak coarse granular structure; very friable; strongly acid; 3 to 6 inches thick; abrupt boundary.

B_{21} 5 to 48 inches, dark-brown (7.5YR 4/4) to reddish-brown (5YR 4/4) silty clay; few, medium, faint mottles of very pale brown (10YR 7/3); moderate medium subangular blocky structure; firm; very strongly acid; many feet thick.

Range in characteristics: In places at depths of 20 to 30 inches, a very fine sandy clay loam to fine sandy loam occurs. In places at a depth of 30 inches, there is a sandy layer. Some areas have mica flakes throughout the profile.

Topography: Gently sloping.

Drainage: Runoff is moderate. Permeability and internal drainage are moderately slow.

Native vegetation: Deciduous forest consisting mainly of red oak, white oak, and hickory.

Wolftever silt loam, eroded gently sloping phase (2 to 6 percent slopes) (WaB2) (Capability unit IIw–2).—The gently sloping areas of this soil are more likely to erode than are the more nearly level areas.

Genesis, Classification, and Morphology

Soil is created by the forces of weathering and soil development acting on the parent soil material that was deposited or accumulated by geologic agencies. At any given time the characteristics of the soil depend on (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and has existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of development have acted on the material.

The five soil-forming factors are interdependent; each modifies the effects of the others. Climate and vegetation are the active forces of soil genesis. The effects of climate and vegetation are influenced by relief. Relief affects the surface drainage, the amount of water that percolates through the soil, erosion, and the vegetation of the soil. The kind of soil that develops is affected by the parent material, which also modifies the effects of climate and vegetation. In some places the kind of profile that forms is determined almost entirely by the nature of the parent material. Finally, time is required for the development of all soils. The length of time during which the forces of soil formation have worked is reflected in the degree that the soil has developed into a body with well-defined horizons.

The factors of soil genesis are so closely interrelated in their effects that few generalizations can be made about one factor unless conditions are specified for the other four. They are so complex in their interrelations that many of the soil-development processes are unknown.

This section relates the outstanding morphological characteristics of the soils of Marshall County to the factors of soil formation. The first part of the section describes the factors of soil formation in Marshall County. The second part tells how the soils are classified in higher categories. In the third part the soil series are placed in great soil groups and their morphology is discussed.

Formation of Soils in Marshall County

Parent materials and parent rock

The parent materials of the soils of Marshall County may be considered in two broad classes: (1) Materials residual from the weathering of rocks in place, and (2) materials transported by water or gravity and laid down as unconsolidated deposits of clay, silt, sand, and larger rock fragments. Materials of the first class are related directly to the underlying rocks from which they were derived; materials of the second class are related to the soils or rocks from which they fell or were washed.

The parent materials that weathered in place consist of the residuum of consolidated sedimentary rocks, limestone, sandstone, and shale. Geologically, the rocks are very old. They were laid down as unconsolidated sediments that were gradually converted into consolidated rocks. Except for most of the rock in the Tennessee Valley, nearly all the rock in the county is level bedded. The rock of the Tennessee Valley is in the Sequatchie anticline and is therefore part of a strong fold.

Soils developed from residual material are generally associated with particular rock formations or parts of rock formations. The Hartsells, Linker, Tilsit, Crossville, and Muskingum soils, and Rockland, sandstone, are commonly associated with the sandier members of the Pottsville formation of the Pennsylvanian rock system; the Albertville soils are commonly associated with the more shaly members. The stony land types of limestone

material are closely related to the Bangor limestone (restricted) and Gasper limestone of the Mississippian system. The Fullerton and Fullerton-Clarksville soils are associated with the Fort Payne (Lauderdale) chert of the lower part of the Mississippian system.

The Colbert soils and some stony land types are associated with the Bangor, Gasper, and Tuscumbia limestones; the Tellico soils with the Red Mountain formation of the Silurian system; and the Colbert and Upshur soils with the Chickamauga limestone of the Ordovician system. The Montevallo soils are associated with the Chattanooga shale of the Devonian or Carboniferous systems.

Some of the characteristics of the parent rock are reflected in the soils formed from transported material. The Pope, Philo, Stendal, and Atkins soils in the mountains consist almost entirely of material derived from acid sandstone and shale. Stony colluvial land, Allen soil material, and Sandy alluvial land, excessively drained, in the valleys are also derived almost entirely from acid sandstone and shale. Other soils in the valleys that consist chiefly of material derived from acid sandstone and shale are the Allen-Waynesboro, Allen, Allen and Jefferson, Jefferson, Monongahela, Tyler, Purdy, and Newark. These soils are somewhat affected by limestone material The following soils consist mostly of limestone material. or material very strongly influenced by limestone: Cumberland and Hermitage, Minvale, Alcoa, Etowah, Captina, Tupelo, Taft, Wolftever, Robertsville, Lobelville, Hollywood, Huntington, Egam, Lindside, Egam-Newark, and Melvin.

A relatively consistent relationship exists between the parent materials and some soil characteristics. However, other soil characteristics, especially those of regional significance from the standpoint of soil genesis, cannot be correlated with the kinds of parent material and must be attributed to other factors.

Climate

The climate of Marshall County is temperate and continental. Summer is long and hot, and winter is short and mild. Rainfall is relatively high throughout the county. The moderately high temperatures favor rapid chemical reactions in the soil, which is moist most of the time. Because of the high rainfall, most of the soluble materials are leached completely from the soil. The less soluble materials and colloidal matter are translocated downward in the soil. The soil is frozen for short periods to shallow depths. This freezing induces further weathering and further translocation of materials.

The climate varies somewhat within the county. Locally, some variations in temperature may be caused by differences in elevation. The climate of the sandstone plateaus is cooler than that of the limestone valleys. On the plateaus, the growing season is from 2 to 3 weeks shorter than it is in the valleys and the soil is frozen for longer periods. The variations between the soils of the plateaus and those of the valleys are in part the result of the differences in climate; they are also the result of differences in parent materials and other soil-forming factors. Because the climate is relatively uniform on the plateaus and in the valleys, in these areas climate plays a small part in forming distinguishing characteristics in the soils.

Plant and animal life

Higher plants, micro-organisms, earthworms, and other forms of life that live on and in the soil contribute to its morphology. They induce changes that, among other things, depend on the kinds of life and the life processes peculiar to each. The kinds of plants and animals that live on and in the soil are determined by climate, parent material, relief, age of the soil, and other factors of environment. The effects of climate are most apparent in determining the kind of plants that will grow on well-drained, well-developed soils, but they are not always most important. Climate, therefore, has a powerful indirect effect on the development of soils.

The natural vegetation on the well-drained, well-developed soils was dominantly deciduous hardwoods, chiefly oak, chestnut, and hickory, with some pine intermixed. Cedars were dominant on residual limestone soils. There were differences in the density of stands, the proportions of the species, and the ground cover. Some of the greater differences in stands, species, and cover were between the forest of the plateaus and the forest of the valleys. These differences were not only the result of variations in climate but were also the result of variations in the kinds of soil that developed. The well-drained, well-developed soils, however, have few marked differences in morphology that are the result of differences in vegetation.

The trees that commonly grow in this area are moderately deep to deep feeders on plant nutrients. They are chiefly deciduous, but among the species the amount of plant nutrients that their leaves contain ranges considerably. The leaves of deciduous trees generally contain a larger quantity of bases and phosphorus than those of coniferous trees. The trees of Marshall County, therefore, return a large amount of essential plant nutrients to the upper part of the soil from the lower part. In this way they retard the depleting action of percolating waters.

Organic material is added to the soil in the form of dead leaves, twigs, roots, and entire plants. Most of it is added to the upper part of the soil, where it is acted upon by micro-organisms, earthworms, and other forms of life, and by direct chemical reaction. The rate of decomposition of this material is relatively rapid, partly because of the favorable temperature and moisture conditions and the favorable character of the organic material itself. The organic material, however, does not accumulate on well-drained sites to the extent that it does in cooler regions under similar drainage conditions. Little is known of the micro-organisms, earthworms, and other life in the soil, but their importance is probably no less than that of the higher plants.

Relief and age

Relief, or lay of the land, varies from place to place in Marshall County. Because of the variations in relief, several different soils may have developed from the same parent material. Relief affects soil formation by affecting internal drainage, runoff, the rate of erosion, and other results of water action.

Generally the longer the parent material has remained in place, the more fully developed the soil profile will be. Because of differences in parent material, relief, and climate, however, some soils mature more slowly than others. Alluvial and colluvial soils are immature because the

parent materials are young and new materials are deposited periodically. Soils on steep slopes are also likely to be immature because erosion removes the soil as fast as it accumulates. Some kinds of parent rock are so resistant to weathering that soil development is very slow, even though other conditions are favorable. A mature soil is one that has well-developed A and B horizons that were produced by the natural processes of soil formation. An immature soil has little or no horizon differentiation.

Classification of Soils

In table 4, the soil series of Marshall County are placed in their respective soil orders and great soil groups, and some of the factors of soil formation are given. The three soil orders—zonal, intrazonal, and azonal—are classes in the highest category of soil classification. The great soil groups are groups of soils that have profiles with many features in common. The section, Soil Survey Methods and Definitions, describes how soils are classified in the lower categories.

Zonal soils are well drained and well developed. In their development they reflect the dominant influence of climate and vegetation over that of parent material and relief. The zonal soils of Marshall County have been formed under relatively similar conditions of climate and vegetation that have influenced their development more than relief and time have influenced it. Because of the similar climate and vegetation, the zonal soils that developed in the county have many characteristics common to all.

Undisturbed zonal soils have surface layers of organic debris in various stages of decomposition. They have a dark-colored A_1 horizon. The A_2 horizon is lighter in color than is either the A_1 or the B. The B horizon normally is uniformly yellow, brown, or red. It is finer textured than the A_1 or A_2. Among the different soils, the C horizon varies in color and texture. Normally it is light red or yellow mottled with gray or brown.

In some zonal soils the silica content decreases and the alumina and iron contents increase with increasing depth. The content of organic matter is moderate in the A_1 horizon, less than moderate in the A_2 horizon, and very low in the B and C horizons. These soils are low in bases and phosphorus within the solum. The loss on ignition is generally low. This indicates a low content of tightly held water. The soils are medium acid, strongly acid, or very strongly acid. In general the quantity of silt decreases with increasing depth from the A_1 horizon through the C horizon, and the quantities of clay and colloids increase. The colloid content of the B horizon is much higher than that of the A_2 horizon.

Intrazonal soils occur on nearly level areas where both internal and external drainage are restricted, or where geologic erosion is very slow. These soils are associated geographically with zonal soils. They have formed from materials that have been in place a long time, and their profiles are fairly well developed. In Marshall County the characteristics of intrazonal soils generally are the results of the effects of the nearly level relief being greatly modified by the effects of the parent material and the vegetation.

Azonal soils are young and poorly developed. They are developing from parent material that has been in place for only a short time, or their development is impeded by poor drainage or other factors. They have poorly defined or no genetic horizons. In Marshall County the azonal soils are characterized by (1) an A_1 horizon that is moderately dark to very dark in color and fairly high in organic matter; (2) the absence of a B horizon or zone of illuviation; and (3) parent material that is usually lighter in color than the A_1 horizon. The parent material of the azonal soils may be similar to the A_1 horizon in texture, or it may be finer or coarser. Azonal soils are sometimes called AC soils because they have no B horizon.

The soils of each of the three soil orders may be derived from similar kinds of parent material. Within any one of the soil orders in Marshall County, the major differences among the soils appear to be closely related to differences in the parent materials of the soils. The depth of soils that developed over parent rock from residual materials is partly dependent upon (1) the resistance of rock to weathering; (2) the amount of residue that is left after weathering; and (3) the rate of geologic erosion. The chemical and physical nature of the parent material modifies the rate and direction of the changes that result from climate and vegetation. The parent material also influences the kind of vegetation that grows on the soil.

Morphology of Soils by Great Soil Groups

In this subsection the soil series of the county are placed in their respective great soil groups and the morphology of the soils of each series is described. Representative soil profiles for the series are described in the subsection, Soil Series, Types, and Phases. The zonal order is represented by Red-Yellow Podzolic soils and Gray-Brown Podzolic soils; the intrazonal order by Grumusols, Low-Humic Gleys, and Planosols; and the azonal order by Lithosols and Alluvial soils.

Red-Yellow Podzolic soils

The soils of the Red-Yellow Podzolic great soil group are well developed and well drained. They have thin organic and organic-mineral horizons over a yellowish-brown to grayish-brown leached horizon. The leached horizon overlies an illuvial red or yellowish-brown horizon. These soils have developed under a deciduous or mixed forest in a warm-temperate moist climate. The yellowish-brown soils of this great soil group probably have developed under a more luxuriant ground cover than have the reddish soils. Laterization and podzolization are the chief processes in the development of Red-Yellow Podzolic soils.

In this county the following series are in the Red-Yellow Podzolic great soil group:

Linker	Alcoa
Fullerton	Allen-Waynesboro
Crossville	Hartsells
Tellico	Albertville
Cumberland and Hermitage	Clarksville
Etowah	Jefferson
Minvale	Wolftever

The soils of these series apparently have developed under similar climate and vegetation. Although they differ somewhat in their degree of maturity, these soils are old enough to have a moderately well-developed profile, which is typical of the Red-Yellow Podzolic soils. They range from level to moderately steep, but differences in slope probably are not the primary cause for the differences in

TABLE 4.—*Classification of the soil series by higher categories*

ZONAL

Great soil group and series	Relief	Parent material	Degree of profile development
Red-Yellow Podzolic soils:		Eluvium from weathering of—	
Linker	Gently to strongly sloping	Sandstone conglomerate	Well developed.
Crossville [1]	Gently sloping to sloping	Sandstone conglomerate	Moderately developed.
Fullerton	Strongly sloping to steep	Cherty dolomitic limestone	Well developed.
Clarksville	Steep	Cherty dolomitic limestone	Moderately developed.
Tellico	Strongly sloping to steep	Shale, sandstone and limestone mixed	Well developed.
Hartsells	Gently to strongly sloping	Sandstone and shale	Moderately developed.
Albertville	Gently to strongly sloping	Shale and sandstone	Well developed.
		Alluvium consisting of material derived from—	
Cumberland [2]	Gently sloping to moderately steep.	Limestone and some sandstone and shale.	Well developed.
Etowah	Nearly level to gently sloping	Limestone, cherty limestone, and some sandstone and shale.	Moderately developed.
Wolftever	Nearly level to gently sloping	Limestone and some sandstone and shale.	Weakly developed.
Waynesboro [2]	Gently sloping to moderately steep.	Sandstone, shale and limestone	Well developed.
		Colluvium consisting of material derived from—	
Hermitage [2]	Gently sloping to moderately steep.	Limestone, cherty limestone, and some sandstone and shale.	Well developed.
Allen [2]	Gently sloping to moderately steep.	Sandstone and some limestone and shale.	Well developed.
Jefferson	Gently sloping to moderately steep.	Sandstone and some limestone and shale.	Well developed.
Alcoa [2]	Gently sloping to sloping	Shale, and some limestone and sandstone.	Well developed.
Minvale	Gently sloping to sloping	Cherty dolomitic limestone	Well developed.
Gray-Brown Podzolic soils:		Eluvium from weathering of—	
Upshur	Strongly sloping to steep	Argillaceous limestone	Moderately developed.

INTRAZONAL

Great soil group and series	Relief	Parent material	Degree of profile development
Grumusols:		Colluvium consisting of material derived from—	
Hollywood	Level to nearly level	Argillaceous limestone	Moderately developed.
Low-Humic Gleys:		Alluvium and colluvium originating chiefly from—	
Atkins	Level to nearly level	Sandstone and some shale	Moderately developed.
Melvin	Level to nearly level	Limestone with some sandstone and shale.	Moderately developed.
Planosols:		Eluvium from weathering of—	
Tilsit [3]	Nearly level to gently sloping	Interbedded sandstone and shale	Well developed.
Colbert [4]	Gently sloping to sloping	Argillaceous limestone and calcareous shale.	Well developed.
		Alluvium consisting of material derived from—	
Captina [3]	Gently sloping	Limestone and some sandstone and shale.	Well developed.
Taft [5]	Nearly level to gently sloping	Limestone and some sandstone and shale.	Well developed.
Robertsville [6]	Level to nearly level	Limestone and some sandstone and shale.	Well developed.
		Alluvium and colluvium consisting of material derived from—	
Tupelo [5]	Nearly level to gently sloping	Argillaceous limestone and some sandstone and shale.	Well developed.
		Alluvium consisting of material derived from—	
Monongahela [3]	Nearly level to gently sloping	Sandstone and some limestone and shale.	Well developed.

See footnotes at end of table.

TABLE 4.—*Classification of the soil series by higher categories*—Continued

INTRAZONAL—Continued

Great soil group and series	Relief	Parent material	Degree of profile development
Planosols—Continued			
Tyler [5]	Nearly level to gently sloping	Sandstone and some limestone and shale.	Well developed.
Purdy [6]	Level to nearly level	Sandstone and some limestone and shale.	Well developed.
AZONAL			
Lithosols:[7]			
		Eluvium from weathering of—	
Muskingum [8]	Sloping to moderately steep	Sandstone, sandstone conglomerate and shale.	Weak to no development.
Montevallo [8]	Moderately steep to steep	Shale	Weak to no development.
Alluvial soils:			
		Alluvium and colluvium consisting of material derived from—	
Huntington	Level to nearly level	Limestone with some sandstone and shale.	Weak to no development.
		Colluvium consisting of material derived from—	
Lindside [9]	Level to nearly level	Limestone mainly	Little development.
		Alluvium consisting of material derived from—	
Newark [9]	Level to nearly level	Limestone with some sandstone and shale.	Little development.
Egam	Nearly level to gently sloping	Limestone mainly	Little development.
Pope	Level to nearly level	Sandstone and some shale	Little or no development.
		Alluvium and colluvium consisting of material derived from—	
Philo [9]	Level to nearly level	Sandstone and some shale	Little development.
Stendal [9]	Level to nearly level	Sandstone and some shale	Weak development.
Sandy alluvial land, excessively drained.	Level to nearly level	Sandstone	No development.
		Colluvium consisting of material derived from—	
Lobelville [9]	Level to nearly level	Cherty limestone	Little development.

[1] Have several characteristics of Brown Forest soils.
[2] Have some characteristics of Reddish-Brown Lateritic soils.
[3] Also classified as Red-Yellow Podzolic soils with fragipan.
[4] Also classified as Red-Yellow Podzolic soils with some characteristics of Planosol argipan.
[5] Also classified as Planosol with fragipan and some characteristics of Red-Yellow Podzolic soils.
[6] Planosol with fragipan.
[7] The following five miscellaneous land types are also classified as Lithosols: Gullied land; Rockland, limestone; Rockland, sandstone; Stony colluvial land, Allen soil material; Stony smooth land, limestone.
[8] Have thin, weak B horizon.
[9] Have some gleization in sublayers.

profile. Many of the differences in profile are mainly the result of differences in parent materials. The parent materials were derived from sandstone, shale, and argillaceous limestone or highly siliceous limestone. The causes for the difference in color between the yellowish-brown and reddish members of this great soil group are not definitely known. The yellowish-brown soils of this county, however, normally have parent material that is lower in bases or is less well drained internally than that of the reddish soils.

The Linker series consists of reddish soils that have developed in place from material derived from sandstone. The parent rock normally is a sandstone conglomerate, whereas the parent rock of the closely associated yellowish-brown Hartsells soils is sandstone. The Linker soils occupy stronger slopes than the Hartsells soils. They were formed on high sandstone plateaus where the climate was probably slightly cooler than that under which the other reddish soils of this county developed. The Linker soils are strongly acid throughout the profile.

The Fullerton soils were developed from residuum derived from dolomitic limestone high in insoluble material, particularly silica. This material occurs chiefly in the form of chert. Fullerton soils commonly occur high on strongly sloping to steep slopes, where they are deep over bedrock, high in chert, and low in fertility. Their limestone parent rock generally contains a larger percentage of insoluble material than that of the Colbert soils and a smaller percentage than that of the Clarksville soils. As the content of insoluble material progressively increases from the Colbert soils to the Fullerton soils and, in turn, to the Clarksville soils, there is an increase in content of chert, thickness over bedrock, and permeability. There is also a decrease in plant nutrients, cohesive properties, and risk of erosion. The Fullerton soils are strongly acid.

The Crossville soils are an intergrade between Red-

Yellow Podzolic soils and Gray-Brown Podzolic soils. They have a dark-brown, very friable fine sandy loam surface soil and a dark-brown fine sandy clay loam to fine sandy loam subsoil. The sandstone conglomerate bedrock generally occurs at depths of about 18 to 20 inches, but moderately deep phases on Gunters Mountain are 30 to 36 inches to bedrock. The Crossville soils are strongly acid.

The Tellico soils were derived from acid to calcareous shale that is interbedded with layers of calcareous sandstone or highly siliceous limestone. They are hilly to steep. Their characteristics generally are less uniform than those of some of the other Red-Yellow Podzolic soils. From place to place these soils vary considerably in depth to bedrock. They are generally reddish and permeable. Throughout the profile they are strongly acid.

Cumberland and Hermitage soils are well-developed reddish soils on high terraces and in old colluvial positions. These soils were developed from old alluvium and colluvium that consist chiefly of material washed from soils underlain by limestone. They are more friable than the Colbert soils and more open and porous in the substratum. Their subsoil is less cherty and finer than that of the Minvale and Fullerton soils. These soils occur in a warm-temperate moist climate. The native vegetation was oak, hickory, yellow-poplar, sweetgum, dogwood, other hardwoods, and, in places, some pine. The relief ranges from gently sloping to moderately steep, although it is mostly gently sloping to sloping. These soils are strongly acid throughout the profile.

The Etowah soils have parent material similar to that of the Cumberland soils and a slightly darker brown surface soil. They are slightly less red in the subsoil. Their substratum is permeable. Most areas of Etowah soils are on stream terraces that are lower than those of the Cumberland soils and are therefore somewhat younger.

The Minvale soils are similar to the Fullerton soils, from which their parent material fell or was washed. They occur on old colluvium on gently sloping to sloping foot slopes of chert ridges. They are generally deeper to bedrock than the Fullerton soils.

The Alcoa soils are somewhat similar to the Tellico soils. They occur on old colluvium that fell or was washed from Tellico soils, which are underlain dominantly by shale but partly by sandstone and limestone. These soils are much deeper to bedrock than the Tellico soils. They have a darker brown surface soil than the Minvale soils and occupy similar topography, but they contain no chert.

Allen-Waynesboro soils occur on old colluvium and alluvium that were derived from sandstone, shale, and limestone. These well-developed red soils are strongly acid. They are more friable than the Cumberland and Hermitage soils and contain more sand throughout the profile. These soils are more sandy and slightly lighter brown than the Etowah soils, and, in places, they contain a larger amount of angular stones. They are gently sloping to moderately steep.

The Hartsells soils have developed chiefly from acid sandstone on the sandstone plateaus, under a deciduous hardwood forest. The depth to bedrock ranges from 15 to 60 inches but in most places is 24 to 42 inches. These soils occur on gentle to strong slopes. On the strong slopes Hartsells soils are normally less than 18 inches deep. They are strongly acid. Although the profile is well developed, it is less well developed than the Albertville profile.

The Albertville soils have developed chiefly over acid shale on the sandstone plateaus, under a deciduous hardwood forest. In some places the shale is intermixed with sandstone but the shale is dominant. About 20 to 36 inches of fine-textured soil normally overlies partially weathered shale rock. These soils are strongly acid. Although they normally occur on gentle to strong slopes, a very small acreage is strongly sloping. These soils are more mature than the Hartsells soils.

The Clarksville soils are closely associated with the Fullerton soils, which are reddish members of the Red-Yellow Podzolic group. They developed under a forest that was mainly deciduous. Their parent material was dolomitic limestone that was more siliceous than the limestone from which the Fullerton soils were derived. The siliceous dolomitic limestone is weathered to a great depth. During the process of weathering, apparently, the residuum has lost most of its bases. It is strongly acid and low in base-exchange capacity. This characteristic indicates that the siliceous part of the residuum dominates in the parent material. These soils normally are not so likely to erode as are most other soils derived from limestone residuum. The small risk of erosion may partly account for the thickness of the weathered material over bedrock.

The Jefferson soils have developed from old colluvium that was derived chiefly from sandstone. This parent material is similar to that of the Allen soils. The Jefferson soils have a lighter colored surface soil than that of the Allen soils, and their subsoil, or illuviated layer, is yellowish brown rather than reddish. Like the Allen soils, the Jefferson soils are strongly acid. They are gently sloping to moderately steep. They are similar to the Hartsells soils except that they were derived from old colluvium instead of being residual, and they are much deeper to bedrock.

The only soil of the Wolftever series mapped in the county is Wolftever silt loam, eroded gently sloping phase. This soil occurs on low stream terraces along the Tennessee River. Its parent material is mixed alluvium derived chiefly from limestone, sandstone, and shale. At times, areas of this soil are flooded. The Wolftever soil is not so well developed as most of the other Red-Yellow Podzolic soils, but it is too well developed to be placed in the Alluvial great soil group. It is more nearly an intergrade between Alluvial soils and Red-Yellow Podzolic soils. It resembles the Egam soils, except that it has a moderately developed profile and is older.

Gray-Brown Podzolic soils

The Gray-Brown Podzolic soils have a thin organic-mineral layer that overlies an acid grayish-brown leached layer. The leached layer overlies an illuvial reddish-brown or grayish-brown horizon. These soils have developed under a deciduous or mixed forest in a warm-temperate moist climate. In Marshall County the Upshur soils are the only members of the Gray-Brown Podzolic great soil group.

The Upshur series consists of well-developed, dark reddish-brown soils that have formed over limestone rock. They are browner, less plastic, and less acid than the Colbert soils, and they occur on steeper slopes. The

Upshur soils differ from Fullerton soils in being browner, shallower, less acid, and in containing no chert. They are moderately acid in the surface soil and upper subsoil and slightly acid to slightly alkaline in the subsoil.

Grumusols

Grumusols are in the intrazonal soil order. They consist of clay that contains much montmorillonite and is slightly calcareous. Their solum is thick and has little textural horizonation. As these soils dry, they contract and crack to a large degree. They have developed in humid and semiarid regions under grass or grass and forest.

Hollywood clay is the only Grumusol mapped in this county. This soil occurs in nearly level, or slightly depressional areas. It is affected by seepage water and is somewhat poorly drained. This soil is slightly alkaline throughout its profile. It has developed from young and old colluvium that was transported chiefly from the Colbert soils.

Low-Humic Gley soils

The Low-Humic Gley soils are in the intrazonal soil order. These soils are imperfectly drained to poorly drained. They have a very thin surface horizon that is moderately high in organic matter. Below the surface horizon is mottled gray to brown gleylike mineral horizons that have little textural differentiation.[3] These soils have developed from poorly drained young alluvium through the process of gleization. In this county the Low-Humic Gley soils are in the Melvin and Atkins series.

The Melvin soils are on the flood plains with the Huntington, Lindside, and Newark soils. The soils of these four series are developing in alluvium that was derived mainly from limestone but partly from sandstone and shale. They are in the same catena. The Melvin soils are less acid and finer textured than the Atkins soils. Their profile is strongly gleyed throughout its depth, and the upper few inches contains a moderate accumulation of organic matter. Most areas of these soils occur on the lowest parts of the bottom lands and are likely to be flooded at times.

The Atkins soils occur on the flood plains in association with the Pope, Philo, and Stendal soils and with them form a catena. The parent material of all these soils consists of alluvium that was derived from acid sandstone and shale.

Planosols

Planosols are intrazonal soils that have an eluviated surface horizon and a B horizon that is more strongly illuviated, cemented, or compacted than that of their associated zonal soils. These soils occur on nearly level uplands, under grass or forest, in a region of humid or subhumid climate. In this county soils of the following series are Planosols:

Tupelo	Monongahela
Tilsit	Tyler
Captina	Purdy
Taft	Colbert
Robertsville	

The Planosols developed under a climate that was similar to that under which the zonal soils developed, but they were less well drained and less well aerated than the zonal soils. Although the kinds and proportions of the trees and grasses differed, Planosols and Red-Yellow Podzolic soils both formed under deciduous forest.

Morphologically, Planosols appear to be older than the Red-Yellow Podzolic soils. Their soil material, however, is not older in years than that of the associated zonal soils that occur on similar relief. Partly because of the relief, geologic erosion has been slow, and the soil material has remained in place long enough for a planosolic profile to form. Because of the impermeable parent material, some of these soils have slow internal drainage. The runoff is also slow, and a compact subsoil has developed in some places.

The Tupelo soils occur on fairly low stream terraces and on old colluvial positions. Their parent material, for the most part, fell or was washed from soils developed over argillaceous limestone. These soils have slow internal drainage similar to that of the Taft and Tyler soils. They are fine textured and have a plastic subsoil and substratum. These soils generally are strongly acid throughout the entire profile, but in some places they are slightly acid.

The Tilsit soils occur on the sandstone plateaus, on gently sloping to nearly level areas. They developed in place from residuum derived from interbedded sandstone and shale. They are deep to bedrock, normally more than 4 feet. The Tilsit soils are the only Planosols on the sandstone plateaus. They are strongly acid.

Captina soils occur on relatively low terraces. Their parent material was transported from soils developed over argillaceous limestone that contained some shale and sandstone. Like the Monongahela soils, they have slow internal drainage, but no part of their profile is sandy. These soils are slightly better drained than the Taft soils and are similar in texture. The entire profile is strongly acid.

The Taft series is the somewhat poorly drained member of the Cumberland-Etowah-Captina-Taft-Robertsville catena. The Taft soils occur in low areas and slight depressions on stream terraces. They are very gently sloping to nearly level. These soils are similar to Tyler fine sandy loam in drainage but do not contain so much sand. They are strongly acid throughout the profile.

The Robertsville series is the poorest drained member of the Cumberland-Etowah-Captina-Taft-Robertsville catena. Only one soil of this series is mapped in Marshall County—Robertsville silty clay loam. This soil occurs in slight depressions and in the lowest parts of stream terraces. It has a light-colored silty clay loam A horizon and a very compact, mottled B horizon. Because of the compact B horizon, internal drainage is slow and the solum is wet or waterlogged for many months during the cooler parts of the year. The soil is very dry during the driest, hottest periods. This soil contains little organic matter. Except in the upper 1 or 2 inches where a small amount of organic matter has accumulated, the eluviated layer of the soil is very light gray or nearly white. The entire profile is moderately acid.

The Monongahela series is the moderately well drained member of the Waynesboro-Monongahela-Tyler-Purdy catena. Monongahela soils occur in gently sloping to nearly level positions on stream terraces. They are similar to Captina soils but have developed from a different kind of parent material. Their parent material is a mix-

[3] THORP, JAMES, AND SMITH, GUY D. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126. 1949.

ture of materials derived from sandstone, shale, and limestone, whereas the Captina soils were derived predominantly from limestone. The Monongahela soils therefore contain more sand. They normally have an A horizon of fine sandy loam and a B horizon, or pan, of very fine sandy clay or fine sandy clay.

The only soil of the Tyler series mapped in the county is Tyler fine sandy loam. This soil is the somewhat poorly drained member of the Waynesboro-Monongahela-Tyler-Purdy catena. It occurs on level to nearly level relief on low stream terraces. It was derived from an admixture of sandstone, shale, and limestone. Runoff and internal drainage are slow. The profile of this soil is in many ways similar to that of the Taft soils, but it contains more sand.

The only soil of the Purdy series mapped in this county is Purdy fine sandy loam. This soil is the poorly drained member of the Waynesboro-Monongahela-Tyler-Purdy catena. It occurs in the more depressed parts of the stream terraces on mixed alluvium. Both runoff and internal drainage are slow. The profile of this soil is similar to that of Robertsville silty clay loam. Both soils have a gray surface layer, but the surface layer of the Purdy soil contains more sand. Both have a tight, compact subsoil. The subsoil of the Purdy soil is mainly gray. This soil is very wet during much of the cooler part of the year, and very hard and dry during the driest, hottest periods.

The Colbert soils were developed over highly argillaceous limestone. They are yellowish brown and rather shallow to bedrock. The Colbert soils differ from Clarksville cherty silt loam chiefly in having a much larger clay content and a sharper gradation from the eluviated layer to the illuviated layer. They also have a shallower solum and a shallower depth to bedrock. The Colbert soils are strongly acid to moderately acid. These soils normally contain no chert, but in places some occurs in the surface soil and upper subsoil. These soils are placed in the Planosol great soil group, but they are actually an intergrade between Planosols and Red-Yellow Podzolic soils.

Lithosols

The Lithosols great soil group consists of azonal soils that differ greatly in profile and in degree of soil development. They also differ in topography, stoniness, and drainage. These soils, however, normally are shallow and occur in rough, hilly, or mountainous areas. In many places they are stony. They commonly are only slightly developed and have no definite profile. In many places the parent material or bedrock is exposed, but in other places the soil is fairly well developed. In some areas the native vegetation consists of grass; in others it is mostly brush or thin open stands of timber. In this county the Muskingum and Montevallo series are in the Lithosol great soil group.

The Muskingum soils are shallow and show little evidence of genetic morphology. They have developed over acid sandstone in most places; in some places they have developed over shale. In most places the steep slopes favor geologic erosion, but the parent rock resists weathering. Sandstone bedrock occurs at depths of 12 to 20 inches. In a few places a profile has developed that is similar to that of the Red-Yellow Podzolic soils. The Muskingum soils are strongly acid throughout the profile.

The only soil of the Montevallo series mapped in the county is Montevallo shaly silt loam, severely eroded steep phase. This soil has developed over acid shale material. Like the Muskingum soils, it occurs on strong slopes and has little profile development. It is normally only 5 to 15 inches deep. Much of the soil material contains shale fragments. The Montevallo soil differs from the Muskingum soils in that it was derived from shale instead of sandstone, and it is more erodible. This soil is strongly acid.

The miscellaneous land types of the county that are classified as Lithosols are:

Stony smooth land, limestone	Stony colluvial land, Allen soil material
Rockland, limestone	Gullied land
Rockland, sandstone	

Chiefly because of the relief, stoniness, and geologic erosion, in most places a true soil does not exist on these stony lands. Gullied lands are areas mutilated or destroyed by accelerated erosion; they represent truncated soils.

Alluvial soils

Alluvial soils are in the azonal great soil group. These soils have developed from recently deposited alluvium. They have had little or no modification. In Marshall County the Alluvial soils occur on first bottoms along streams and in depressions in the uplands. They are nearly level to depressional. Internal drainage ranges from excessive to slow. The horizons of their profile are not genetically related because the soil materials have not been in place long enough to be affected by the active factors of soil formation. The following are the Alluvial soils in this county:

Huntington	Pope
Lindside	Philo
Newark	Sandy alluvial land, excessively drained
Lobelville	Stendal
Egam	

The Pope, Philo, and Stendal soils occur on mountain plateaus. The rest of these soils are in the limestone valleys.

The Huntington, Lindside, Newark, and Melvin (Low-Humic Gley) soils are in the same catena. They occur on young local and general alluvium. This alluvium was derived mainly from limestone mixed with some material derived from sandstone and shale. The soil material of the Huntington and the mottle-free part of the Lindside soils are browner than the Pope and Philo soils. The reaction of the soils in the Huntington-Lindside-Newark-Melvin catena is nearly neutral. In a few areas the Huntington soils have some structural development to depths of 20 to 24 inches, but generally the profile is very poorly developed. Lindside silt loam, local alluvium phase, is slightly gleyed below 14 to 18 inches. The Newark soils are strongly gleyed below 10 to 15 inches.

Lobelville cherty silt loam, local alluvium phase, is developing from local alluvium that was washed from soils underlain by cherty limestone. It is well drained to moderately well drained. It is somewhat similar to the local alluvium phases of the Huntington soils, but it contains much chert in the profile and is less red in the

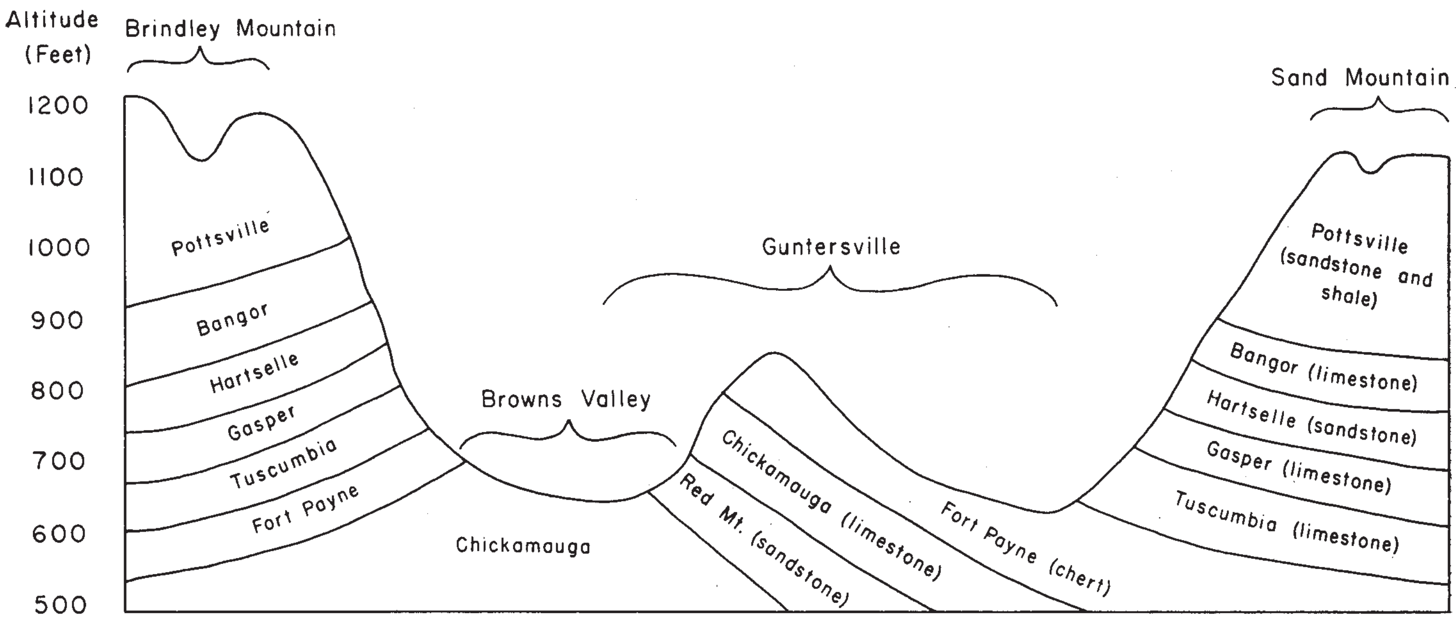

Figure 15.—**East-west profile through Guntersville. Horizontal distance approximately 7 miles.**

surface layer. To depths of 16 to 44 inches, this soil is dark-brown (10YR 4/3) silt loam that contains a large amount of chert. This layer overlies yellowish-brown (10YR 5/4) to brown (7.5YR 5/4) cherty silty clay loam that is mottled. The profile is strongly acid.

The Egam soils are moderately well drained. They are developing from alluvium derived mainly from limestone. These soils are developing from parent material similar to that of the Huntington soils, but they are finer textured and more compact than the Huntington soils. They have little structural development. External drainage is slow; internal drainage is moderately slow. The Egam soils are better drained than the Newark soils and are more compact. They are slightly acid to neutral.

The Pope, Philo, Stendal, and Atkins (Low-Humic Gley) soils are in the same catena. These soils occur on the sandstone plateaus along first bottoms that are likely to be flooded periodically. Their brown to dark-brown soil material is normally free of mottles to a depth of 30 inches. Below this depth the material is dark yellowish brown faintly mottled with gray. The gray mottles increase with increasing depth. The entire profile is strongly acid.

The Philo soils are moderately well drained, and the Stendal soils are poorly drained. These soils make up a level to nearly level soil complex that is developing on local alluvium. They are strongly acid.

Sandy alluvial land, excessively drained, can be placed in the Alluvial great soil group. It occurs in the limestone valleys in small areas next to the stream channels. Because it contains little clay, plant nutrients are readily leached. It is excessively drained and strongly acid.

General Nature of the Area

The location, extent, and physiography of the county are given at the beginning of this report. The following section describes other general features of the county.

Geology

The geologic formations exposed at the surface in Marshall County range from the Ordovician system to the Pennsylvanian system.[4] In figure 15 the exposures of these formations are shown by an east-west profile through Guntersville.

The Pottsville formation (Pennsylvanian) has the most extensive exposure in the county. It forms the capping on Sand, Brindley, and Gunters Mountains and on several nearly isolated knobs and small plateaus. This formation consists of sandstone, conglomerate, and shale. Materials weathered from it make up the parent material of the soils of the plateaus. They also form a large part of many of the alluvial soils in the limestone valleys.

The Bangor limestone (Mississippian) outcrops on mountain slopes. This formation consists mainly of bluish-gray, thick-bedded, coarsely crystalline or finely granular limestone. It has a few strata or lenses of shale. In many places it has been covered by colluvium derived from sandstone and shale. Apparently because of the strong slope and active geologic erosion, the soil material that has weathered in place over Bangor limestone is thin. This material, however, is an important part of some of the soils that occur on colluvium in the valleys. This formation ranges in thickness from 100 to 700 feet.

The Hartselle sandstone (Mississippian) lies below the Bangor limestone. It consists of thick- and thin-bedded sandstone, but it is covered with soil material that has been washed or has rolled from the higher lying formations. The soils that were derived from this formation are similar to those derived from the sandstone of the Pottsville formation.

The Gasper limestone (Mississippian) is mainly shale with thin layers of limestone. It occurs in Click Hollow. This formation is moderately resistant to weathering,

[4] Butts, C., Stephenson, L. W., Cook, W., and Adams, G. I. Geology of Alabama. Ala. Geol. Survey, Spec. Rpt. 14. 312 pp., illus. 1926.

and the soils that were derived from it are moderately shallow. Rock outcrops are common.

Tuscumbia limestone (Mississippian) is similar to Fort Payne chert, which is directly below it. Like Fort Payne chert, this limestone weathers and leaves fragments of chert, but the chert contains fossils that differ from those in Fort Payne chert. Very little Tuscumbia limestone occurs in the county, and generally the exposures are less than 1,000 feet wide. This formation is less resistant to weathering than the other limestones in the county. Although Fort Payne chert is below Tuscumbia limestone in the geologic column, because of folding and different weathering, in places materials that weathered from Fort Payne chert have covered the soil that has developed from the Tuscumbia formation.

Fort Payne chert (Mississippian) is light-gray flinty chert that contains some shale. This formation makes up much of the Dividing Ridge and other chert ridges. It weathers to light-gray porous chert. Fullerton-Clarksville soils have developed on this chert. The soils derived from this formation are generally deep. They contain much chert throughout the profile. In places some of the material weathered from this formation has slipped down over the Red Mountain formation and the Chattanooga shale.

Along Dividing Ridge, Chattanooga shale (Devonian) outcrops on the crests of the ridges that consist of the Red Mountain formation, the Chickamauga limestone, and the Fort Payne chert. The shale outcrops occur as very narrow short strips. The soils derived from this shale are very shallow.

The Red Mountain formation (Silurian) is dominantly red shale, but it contains some gray shale and red sandstone. The shale generally weathers faster than the sandstone. This formation occurs in long narrow strips on the west side of Dividing Ridge. In places the soil material from this formation has covered the lower lying soils on the Chickamauga limestone.

The Chickamauga limestone (Ordovician) underlies the Red Mountain formation. It is exposed in Browns Valley. It is hard, bluish-gray, argillaceous rock that is highly fossiliferous in places. These rocks weather into Colbert soils.

TABLE 5.—*Temperature and precipitation at Albertville Station, Marshall County, Alabama*

[Elevation, 1,114 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1943)	Wettest year (1946)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	44. 3	76	8	5. 36	3. 48	4. 52	0. 5
January	43. 7	77	−8	5. 15	2. 17	11. 32	1. 8
February	45. 6	77	−6	4. 88	2. 98	9. 29	. 4
Winter	44. 5	77	−8	15. 39	8. 63	25. 13	2. 7
March	52. 0	84	10	6. 29	8. 69	8. 39	. 1
April	60. 1	89	25	4. 66	5. 03	6. 00	0
May	68. 9	96	35	4. 21	2. 63	7. 74	0
Spring	60. 3	96	10	15. 16	16. 35	22. 13	. 1
June	76. 7	105	48	4. 24	1. 47	2. 21	0
July	78. 9	105	53	5. 01	3. 03	8. 34	0
August	78. 2	103	50	4. 41	2. 58	3. 69	0
Summer	77. 9	105	48	13. 66	7. 08	14. 24	0
September	72. 7	101	38	3. 17	4. 90	7. 55	0
October	62. 3	93	23	3. 27	. 46	2. 58	0
November	51. 0	81	0	3. 72	1. 77	6. 95	. 1
Fall	62. 0	101	0	10. 16	7. 13	17. 08	. 1
Year	61. 2	105	−8	54. 37	39. 19	78. 58	2. 9

[1] Average temperature based on a 29-year record, through 1954; highest and lowest temperatures on a 19-year record, through 1952.

[2] Average precipitation based on a 30-year record, through 1955; wettest and driest years based on a 26-year record, in the period 1908–1955; snowfall based on a 21-year record, through 1952.

Climate

Marshall County has a humid temperate climate. Winters are cold and summers are hot. The average annual precipitation at the United States Weather Bureau station at Albertville is 54.37 inches, and the annual temperature is 61.2° F. (table 5). In December, January, and February, the temperature often falls below freezing at night, but during the day freezes seldom occur. The snowfall rarely exceeds a few inches, and the snow generally melts in a few days. The average frost-free period of 217 days extends from March 30 to November 2. The Weather Bureau, however, has recorded frost as late in spring as April 9 and as early in fall as October 26.

At Guntersville the average monthly precipitation recorded by the Hydraulic Branch of the Tennessee Valley Authority for the 10-year period from 1944 to 1953 was as follows:

Month	*Inches*
January	7. 01
February	6. 37
March	7. 30
April	4. 15
May	3. 18
June	4. 34
July	4. 08
August	3. 23
September	3. 81
October	2. 89
November	4. 30
December	5. 19
Total for year	55. 85

During this 10-year period the highest precipitation in any single month was 11.71 inches in January 1947; the lowest in any month was 0.27 inches in August 1953. The highest total precipitation in any single year was 75.39 inches, in 1946; the lowest in any year was 44.77 inches, in 1947.

The climate is suitable for growing a wide variety of crops, including corn, cotton, oats, winter legumes, and grasses for hay and pasture. Winter is mild enough for vetch, crimson clover, and similar crops to be grown for winter cover. The growing season is long enough for these crops to be turned under in spring before cotton or corn is planted.

Short periods of very wet and very dry weather are common. Although it is fairly dry from midsummer until late fall, normally there is enough rainfall for good yields of crops. Severe winds are rare, but a few winds

of tornado force do strike. Although floods are most common from December 15 to April 15, they may occur at any time. The many electrical storms that occur seldom cause serious damage. In local areas hail damages crops in some years.

Water Supply

Some of the springs that were used by the early settlers are still in use in the county. Except during years that have very droughty summers, most of the springs flow all year. Drinking water is available in all parts of the county. Drilled wells are common. The wells generally range in depth from 50 to 70 feet, but some are shallower and some are deeper. In some places wells must be drilled to a depth of 150 feet or more before good water is reached.

Farmers are irrigating their fields more than they did formerly. Several farmers irrigate with water from Guntersville Reservoir; a few are irrigating from farm ponds. Many ponds have been built to water livestock.

Forest

Most of the county is cleared. About one-fourth of the total area is in forest. About four-fifths of this forested area is on hilly to steep slopes—areas that are better suited to forest than to any other use.

The soils that were derived from sandstone and shale are mostly in deciduous hardwoods and mixed pines. The deciduous trees include black oak, white oak, post oak, chestnut oak, hickory, poplar, maple, and beech. These trees are also dominant on the soils derived from limestone, except where the soils are rocky and have a plastic subsoil. In these places cedar is dominant. Generally, fewer pines grow on soils derived from limestone than on soils derived from sandstone and shale. Sumac, blackberry, grape, ivy, and other shrubs and vines are common on all the soils.

Most of the trees are cut when they are large enough to be used. The cedar trees are used for fence posts. Because there is little forest in the county, only a few small sawmills operate.

Transportation

The Nashville, Chattanooga, and St. Louis Railway is the only railroad in the county. It connects Guntersville, Albertville, and Boaz. Freight cars are carried by barge from Guntersville down the Tennessee River to Hobbs Island, in Madison County. Most of the traffic on the Tennessee River is freight, but a few boats carry passengers. Buses serve Guntersville, Albertville, Boaz, and Arab. Guntersville and Albertville both have city bus service and a small airport for private planes. Motortruck lines connect the county with all parts of the country. Since 1935 many farm-to-market roads have been built. Before 1950 few roads except the main highways were hard surfaced, but since that time many of the farm-to-market roads have been hard surfaced.

Industries

Marshall County had little industry until after 1939, when Guntersville Reservoir was built. Since 1939 sizable facilities have been developed to ship by water large amounts of coal, oil, automobiles, grain, pulpwood, and other commodities. Small manufacturing plants operate in Guntersville, Albertville, Boaz, and Arab. The plants mill cotton and manufacture clothing, furniture, and other products. The total industrial employment is between 4,000 and 4,500 workers.

Organization and Population

Marshall County was created by an act of the State legislature on January 9, 1836. The county was named for Chief Justice John Marshall. Its original territory was taken from Jackson and Blount Counties and from the last cession from the Cherokee Indians. In 1790 a group of settlers came to the area from east Tennessee, North Carolina, and Virginia.

Guntersville, the county seat, was settled in 1790 by the Cherokee Indians. It is ideally located in the center of the county on the Tennessee River. It was named for John Gunter, an early settler who lived among the Cherokees. As early as 1818 Gunter operated a ferry across the Tennessee River. After navigation on the river increased, the town became a favorite stopping place for flatboats.

The number of Indians in the area increased until 1830. At one time there were almost 800 Indians, most of them in Browns Valley. The Presbyterian Church established a mission church and school for the Indians in 1820. Two years later the Methodist Church also established a mission school and church. By 1839 all the Indians had left the county. After the Indians moved west, the congregations of these churches changed from Indian to white.

The population of Marshall County has increased from 23,289 in 1900 to 45,090 in 1950. In 1950 the population of the largest towns was: Guntersville, 5,253; Albertville, 5,397; Boaz, 3,078; Arab, 1,592; and Grant, 191.

Community Facilities

From 1930 to 1956 the number of schools in the county decreased from 73 to 42, but the schools increased in size. The county has 6 high schools. Snead Junior College at Boaz is the only college in the county. Churches of many denominations are distributed throughout the county.

Guntersville and Albertville both have a radio station. A daily county newspaper and a biweekly are published at Guntersville. Boaz and Albertville both publish a weekly paper. Mail is delivered to all communities. There is one hospital at Arab; two are at Albertville. Guntersville has one hospital and a health unit. The towns have telephone and telegraph facilities, and many rural areas have telephones.

Recreational Facilities

Marshall County has many recreational facilities. A large number of people spend their summer vacations at Guntersville Reservoir, which offers fishing, boating, swimming, and other water sports. There are many private camps where people can spend a week or more. North of Guntersville there is a public beach. The Little Mountain State Park, which is being established will increase the recreational facilities of the county.

Agriculture

Before the white settlers came to the area, the Indians grew corn, peas, beans, squash, and other edible plants and cotton. They also raised many cattle. The first white settlers slowly cleared the land of the dense forest. Because the soils lost their productivity after a few years of cropping, the settlers abandoned their fields and cleared new land.

Soon there was an abundance of cotton, cattle, and hogs. The cotton was ginned and baled by crudely constructed gins that were powered by water. The bales were hauled by wagon or floated on flatboats or rafts to river ports. Then they were shipped to New Orleans and other markets. Cattle and hogs were raised on the open range. At times droves of several hundred hogs were driven overland and sold to plantation owners in central and southern Alabama.

Crops

Cotton and corn are the principal crops in the county (fig. 16). Potatoes, sweetpotatoes, sweet corn, and other vegetables are also grown. The acreage of the principal crops of the county is shown in table 6.

Until recently few farmers used definite crop rotations, but the use of rotations is increasing. In some places cotton is followed by a winter cover crop. The cover crop is turned under in spring when the corn is planted. The use of fertilizer is also increasing. Commercial fertilizer is now used on most farms. Most of the cotton and corn is sidedressed with 100 to 200 pounds of commercial fertilizer 4 or 5 weeks after planting. Fertilizer, however, is not used in those areas that are likely to be flooded. Some plowing is done in fall, but most of it is done in winter or early in spring. When a winter cover crop is grown, the plowing is delayed until late in spring.

Corn.—Corn is the most extensively grown crop in the county. When the Tennessee Valley Authority flooded much of the flood plain in 1939, some of the land most suitable for corn was covered. Since 1939 corn has been grown mostly on the uplands. Corn is usually planted in rows 3 to 4 feet apart. The seed is placed in the ground at intervals of about 14 to 18 inches. If the corn is fertilized at the time it is planted, both the seed and the fertilizers are placed in the ground by the planter. Corn is planted from about the first of April to the first of June. It is harvested in October. The better drained soils are planted early, but those on the lower lying first bottoms and other slowly drained soils are not planted until as late as the last part of May.

***Figure 16.*—Corn in the foreground and cotton in the background. These crops are planted on the contour.**

Table 6.—*Acreage of principal crops and number of bearing fruit and nut trees in Marshall County, Alabama, in stated years*

Crop	1929	1939	1949	1954
	Acres	*Acres*	*Acres*	*Acres*
Corn, for all purposes	55, 130	77, 845	62, 871	79, 050
Cotton	82, 120	46, 340	70, 762	35, 357
Sorghum, for all purposes except sirup	212	576	776	433
Oats, threshed	18	126	270	787
Soybeans, grown alone	6, 500	15, 455	3, 556	1, 617
Cowpeas, grown alone	1, 887	2, 238	238	199
Peanuts, grown alone	216	358	50	31
Hay total [1]	2, 553	2, 827	5, 255	6, 179
Alfalfa	254	114	1, 658	418
Lespedeza	(2)	1, 942	2, 043	3, 160
Clover and timothy	309	90	217	369
Small grains cut for hay	170	78	541	984
Other hay cut	1, 820	603	796	1, 248
Irish potatoes	674	1, 237	[3] 292	[4] 109
Sweetpotatoes	495	943	[3] 264	[4] 120
	Number [5]	*Number* [5]	*Number* [5]	*Number*
Apple trees	23, 289	24, 959	23, 369	6, 015
Peach trees	26, 613	34, 205	23, 788	6, 355
Pecan trees	322	1, 275	3, 143	1, 081

[1] Excluding soybean, cowpea, peanut, and sorghum hay.
[2] Not reported.
[3] Does not include acreage for farms that harvested less than 15 bushels.
[4] Does not include acreage for farms that harvested less than 20 bushels.
[5] One year later than year given at head of column.

Cotton.—The second most extensively grown crop in the county is cotton. It is planted about the same time as corn. The best time for planting is in April or early in May. Cotton is planted in rows 3 to 4 feet apart. The seed is placed in the ground at intervals of about 8 inches. Cotton picking normally begins early in September. Most of the cotton is picked before the first part of November.

Minor crops.—Potatoes, sweetpotatoes, sweet corn, squash, okra, beans, greens, and peas are grown mostly to be used at home. The surplus is sold in the towns. Except for some of the greens, the vegetables are planted in April or May. A considerable acreage is in soybeans. In a few places sorghum is grown and sold to be made into sirup. Because it is a perennial, sericea lespedeza is an important hay crop. It grows well on most of the soils of the county and produces hay that is easily cured.

Fruits and nuts.—Only a little fruit is grown in the county, and this is grown to be used at home. The main fruits are peaches and apples. Pecans are also grown. The number of fruit trees in the county appears to be declining. In some years frosts late in spring cause loss of fruit. Further losses are caused if the trees are not pruned in February before their growth in spring and if they are not sprayed to kill worms.

Pasture

In 1954 there were 67,697 acres of pasture in the county. Most of the pasture is classified as unimproved, but much work has been done to establish permanent improved pasture. In some places the permanent pasture is mowed in summer and early in fall to remove briers and weeds. Some of the improved pasture is on plateaus; some is in the valleys.

Most of the permanent pasture has been cleared of underbrush and trees. These pastures are in grasses or mixtures of grasses and legumes. The varieties of plants grown differ according to the moisture conditions and the amount of lime in the soil. The more water-tolerant plants are grown in the low wet areas.

In the pastures that are cleared but otherwise unimproved, the most common grasses are broomsedge, crabgrass, bermudagrass, and johnsongrass. In some places whiteclover may grow in unimproved pasture, but it seldom maintains good stands unless it is fertilized and limed.

Only a small part of the soil that is well suited to crops is used for pasture. In the valleys the pasture generally is in low areas that are likely to be flooded, and in erodible areas that border Rockland, limestone; Rockland, sandstone; and Gullied land. It is also on the steeper slopes of the mountains and plateaus, on bottom lands along drains, on benches below escarpments, and in shallow stony areas. In a few places, however, some of the soils that are best suited to corn are used for pasture. These areas are on the wide tops of chert ridges and along the gentle slopes.

Much of the pasture is infested by noxious weeds that crowd out the pasture plants and have a harmful effect on the dairy products. The common weeds are bitterweed, wild onion, dogfennel, yellowtop, ox-eye daisy, bullgrass, and bullnettle. Broomsedge is more of a pest than a pasture grass, but its young shoots do give some forage.

Livestock and Livestock Products

Cattle and swine are the principal livestock in the county (table 7). Most farms have a small flock of chickens. The most popular breeds of hogs are Poland China, Duroc, and Hampshire. The most common beef cattle are Hereford, Shorthorn, and Aberdeen Angus. The few dairy farms in the county have Holstein, Guernsey, and Jersey cattle.

TABLE 7.—*Number of livestock on farms in stated years*

Livestock	1930	1940	1950	1954
Horses and mules	9, 599	[1] 9, 501	7, 700	3, 223
Cattle and calves	11, 741	[1] 11, 297	14, 969	19, 552
Swine	4, 352	[2] 9, 730	21, 245	20, 208
Sheep and lambs	378	[3] 140	71	1, 087
Chickens	[1] 169, 226	[2] 199, 669	[1] 209, 571	[1] 183, 319

[1] Over 3 months old.
[2] Over 4 months old.
[3] Over 6 months old.

Beef cattle are more numerous in the county than dairy cattle. Most farmers keep one or more cows to meet their need for milk at home. Some have a small surplus to market. The amount of milk sold in the county increased from 368,759 gallons in 1944 to 436,609 gallons in 1954. There were 6,292 milk cows reported in the county in 1954.

Type and Size of Farms

In 1954 the number of farms by type in the county was as follows:

	Number of farms
Field-crop farms	2, 768
Cash-grain	21
Cotton	2, 627
Vegetable	10
Fruit and nut	5
Other field crops	5
Livestock farms	454
Poultry	241
Dairy	27
Other livestock	186
General farms	86
Miscellaneous and unclassified	1, 488

In 1954 the 4,858 farms in the county ranged in size from less than 10 acres to more than 1,000 acres. About 61.6 percent of the farms contained 49 acres or less; about 35.6 percent, from 50 to 219 acres; and about 2.8 percent, from 220 to more than 1,000 acres.

Farm Tenure and Labor

In 1954, owners operated 3,102 farms, or 63.9 percent of all the farms in the county. Tenants operated 1,749 farms, or 36.0 percent, and managers operated 7 farms, or 0.1 percent. There were 46 cash tenants, 44 share-cash tenants, 1,494 share tenants and croppers, and 165 other operators. According to local information, most of the leases were made verbally for 1 year.

In 1954, 1,967 farms reported that 7.2 percent of their total expenditure was for hired labor. Experienced farm help is not as plentiful in the county as it was in 1940. Even though other laborers may not be hired, most farmers hire cotton pickers.

Farm Power and Mechanical Equipment

Work animals supply some of the farm power, but the number of work animals has declined sharply in recent years. In 1954 there were 4,477 fewer horses and mules in the county than in 1950. The number of tractors increased from 366 in 1945 to 2,067 in 1954. Most of the farms have tractor plows, harrows, disks, 2-row planters with fertilizer and planting attachments, 2-row cultivators, and mowers. Some have small combines or have access to them. Most of the farms without tractors have 1- or 2-horse moldboard plows, harrows, cultivators or shovel plows, 1-horse fertilizer distributors, and 1-horse planters and mowers. Some have hayrakes and disk harrows. A few farmers use a combined fertilizer distributor and seeder pulled by a horse or a mule.

Glossary

Acidity. The degree of acidity of the soil mass technically expressed in words or pH values as follows:[5]

	pH		pH
Extremely acid	below 4.5	Neutral	6. 6–7. 3
Very strongly acid	4. 5–5. 0	Mildly alkaline	7. 4–7. 8
Strongly acid	5. 1–5. 5	Moderately alkaline	7. 9–8. 4
Medium (moderately) acid.	5. 6–6. 0	Strongly alkaline	8. 5–9. 0
Slightly acid	6. 1–6. 5	Very strongly alkaline.	9. 1 and higher.

Alluvium. Fine material, such as sand, mud or other sediments, deposited on land by streams.

Catena. A group of soils, within a specific soil zone, formed from similar parent materials but with unlike soil characteristics because of differences in relief or drainage.

Colluvium. Deposits of rock fragments and soil material accumulated at the base of slopes through the influence of gravity. Colluvium includes creep and local wash and in many areas is relatively mixed.

Consistence. A soil term expressing degree of cohesion and the resistance to forces tending to deform or rupture the aggregate. The relative mutual attraction of the particles in the whole mass, or their resistance to separation. Terms used to describe consistence include sticky, plastic, loose, friable, firm, and hard.

Firm. Resistant to forces tending to produce rupture or deformation when soil is moist.

Friable. Readily crushed by application of gentle to moderate force when soil is moist, and coheres when pressed together.

Hard. Resistant to pressure but, with difficulty, can be ruptured or deformed when soil is dry.

Loose. Noncoherent when soil is dry.

Plastic. Readily deformed without rupture; cohesive; can be readily molded.

Sticky. Adhesive rather than cohesive when wet; shows a decided tendency to adhere to other material and objects.

Erosion, soil. The wearing away or removal of soil material by water or wind.

Fertility, soil. The capacity of a soil to supply the amounts, kinds, and proportions of nutrients needed for normal growth of specified plants when other conditions such as water, light, and heat are favorable.

Fragipan. A compact horizon rich in silt, sand, or both, and usually relatively low in clay.

Genesis (*See also* Horizon). Mode of origin of the soil, referring particularly to the processes responsible for the development of the solum (Horizon A and B) from the unconsolidated parent material.

Granular (*See also* Structure). Type of soil structure in which the aggregates are roughly spherical, either hard or soft, and lack the distinct faces of blocky structure.

Great soil group (soil classification). A broad group of soils that have common internal soil characteristics.

Horizon, soil. Layer, or part of the soil profile approximately parallel to the land surface, that has more or less well-defined characteristics.

Horizon A. The upper horizon of the soil mass from which material has been removed by percolating water; the eluviated part of the solum; the surface soil. It is generally subdivided into two or more subhorizons. The A_0 horizon is not a part of the mineral soil but the accumulation of organic debris on the surface. Other subhorizons are designated as A_1, A_2, and so on.

Horizon A_p. The plow layer entirely within the A horizon.

Horizon B. The horizon of deposition to which materials have been added by percolating water; the illuviated part of the solum; the subsoil. This horizon may be divided into several subhorizons, depending on the color, structure, consistence, or character of the material deposited. These layers are designated as B_1, B_2, B_3, and so on.

Horizon AB_p. The plow layer consisting of a mixture of materials originally of the A and B horizons.

Horizon C. The horizon of partly weathered material underlying the B horizon; the substratum; usually the parent material.

Horizon D. Any substratum underneath the soil, such as hard rock or layers of clay and sand, that is not parent material but which may have significance to the overlying soil.

Internal drainage. Refers to the movement of water through the soil profile. The rate of movement is affected by the texture of the surface soil and subsoil, and by the height of the ground water table, either permanent or perched. Relative terms for expressing internal drainage are the following: Very rapid, rapid, medium, slow, very slow, and none.

Layer, gley. Layer of intense reduction characterized by the presence of ferrous iron and neutral gray colors that commonly change to brown upon exposure to the air. Layer designated by the use of "g" after the horizon designations B or C.

Layer, indurated. A layer, designated by symbol "m" (suggesting massive), that is indurated to a greater degree than horizon having only the principal horizon designations given. Composed of materials containing silicate minerals, such as those in fragipans. Is within solum or beneath it.

Massive (*See also* Structure). Large uniform masses of cohesive soil.

Morphology. The physical constitution of the soil expressed in the kinds of horizons, their thickness and arrangement in the profile, and the texture, structure, consistence, porosity, and color of each horizon.

Mottles, soil. Contrasting color patches that vary in number and size. Descriptive terms are as follows: Contrast—faint, distinct, and prominent; number—few, common, and many; and size—fine, medium, and coarse. The size or measurements are the following: Fine, commonly less than 5 mm. (about 0.2 inch) in diameter along the greatest dimension; medium, commonly ranging between 5 and 15 mm. (about 0.2 to 0.6 inch) along the greatest dimension; and coarse, commonly more than 15 mm. (about 0.9 inch) along the greatest dimension.

Nutrients, plant. The elements taken in by the plant, essential to its growth, and used by it in the elaboration of its food and tissue. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps others, which are obtained from the soil; and carbon, hydrogen, and oxygen, obtained largely from the air and water.

Parent material (*See also* Horizons C and D, Profile, and Substratum). The material from which the soil profile develops.

Permeability, soil. The ability of air and water to penetrate the soil.

Productivity, soil. The capacity of a soil to produce a specified plant, or plants, under a given system of management.

Profile, soil. A vertical section of the soil, from the surface into the parent material.

Relief. The elevations or inequalities of the land surface, the slope gradient, and the pattern of these.

Sand. Small rock or mineral fragments with diameters ranging between 0.05 mm. (0.002 inch) and 2.0 mm. (0.078 inch). The term sand is also applied to soils containing 90 percent or more of sand.

Silt. Small mineral soil grains ranging from 0.002 mm. (0.000079 inch) to 0.05 mm. (0.002 inch) in diameter.

Soil. An organized natural body occurring on the surface of the earth, characterized by conformable layers resulting from modification of parent material by physical, chemical, and biological forces through various periods of time.

Solum. (*See also* Horizon A and B). The genetic soil developed by soil-building processes. In normal soils the solum includes the A and B horizons, or the part of the soil profile above the parent material.

Structure, soil. The morphological aggregates in which the individual soil particles are arranged. It may refer to their natural arrangement in the soil when in place and undisturbed or at any degree of disturbance. Soil structure is classified according to grade, class, and type.

Grade. Degree of distinctness of aggregation; expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: Structureless (single grain or massive), weak, moderate, and strong.

Class. Size of soil aggregates. Terms: Fine, medium, and coarse.

Type. Shape of soil aggregates. Terms: Platy, prismatic, columnar, angular blocky, subangular blocky, and granular (nonporous).

Subsoil. Technically, the B horizon; roughly, that part of the profile below plow depth.

Substratum (*See also* Horizon C and Parent material). Material underlying the subsoil.

[5] SOIL SURVEY STAFF. SOIL SURVEY MANUAL. U. S. Dept. Agr. Handbk. No. 18, 503 pp., illus. 1951.

Surface runoff (or runoff). This term refers to the amount of water removed by flow over the surface of the soil. The amount and rapidity of surface runoff are affected by factors such as texture, structure, and porosity of the surface soil and subsoil; the vegetative covering; the prevailing climate; and the slope. Relative degrees of surface runoff are expressed in six classes as follows: Very rapid, rapid, medium, slow, very slow, and ponded.

Surface soil. Technically the A horizon; commonly, the part of the upper profile normally stirred by plowing.

Terrace (For control of surface runoff, erosion, or both). A broad surface channel or embankment constructed across sloping land on or approximately on contour lines at specific intervals. The terrace intercepts surplus surface runoff to retard it for infiltration or to direct the flow to an outlet at nonerosive velocity.

Terrace (geologic). An old alluvial plain, usually flat or smooth, but may have fairly strong slopes in places. There are high and low terraces. Low terraces are usually flat or smooth; high terraces may be flat or smooth or have strong slopes. Some low terraces are subject to overflow, but not the high terraces.

Texture, soil. Refers to the relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of clay, silt, and sand. A coarse-textured soil is one high in sand; a fine-textured soil has a large proportion of clay.

Topography (*See* Relief). The physical features of any locality or region, such as the slope and general configuration.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying in general at higher elevations than the alluvial plain or stream terrace.

Fussell, Kenneth Eugene, 1921—

Soil survey, Marshall County, Alabama. [Soils surveyed by K. E. Fussell and others. Report by K. E. Fussell and E. A. Perry. Correlation by I. L. Martin. Washington] U.S. Dept. of Agriculture, Soil Conservation Service, 1959.

ii, 61 p. illus., col. maps (part fold.) 29 cm. (U.S. Soil Conservation Service. Soil survey, ser. 1956, no. 2)

Cover title.
Bibliographical footnotes.

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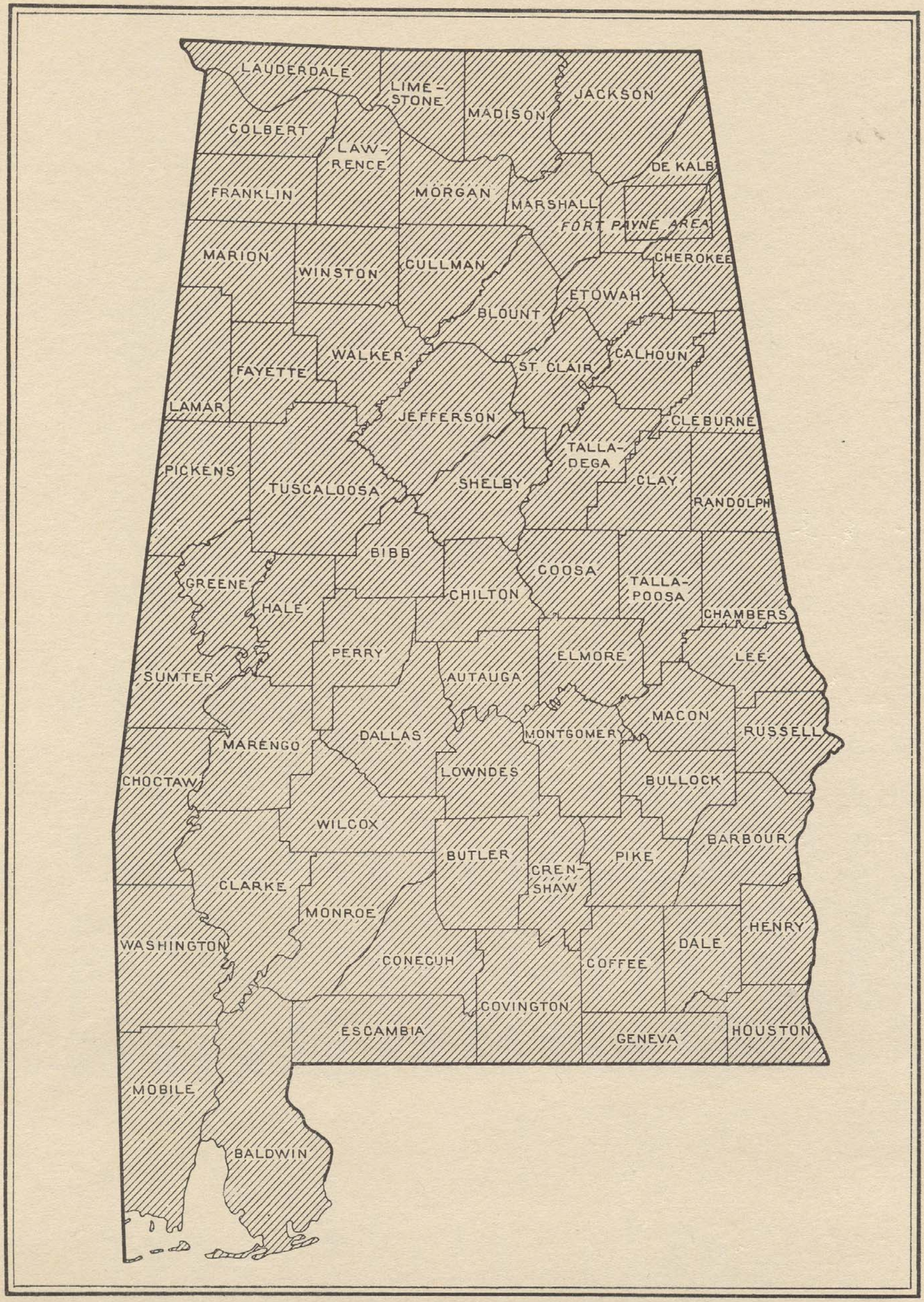

Areas surveyed in Alabama shown by shading.

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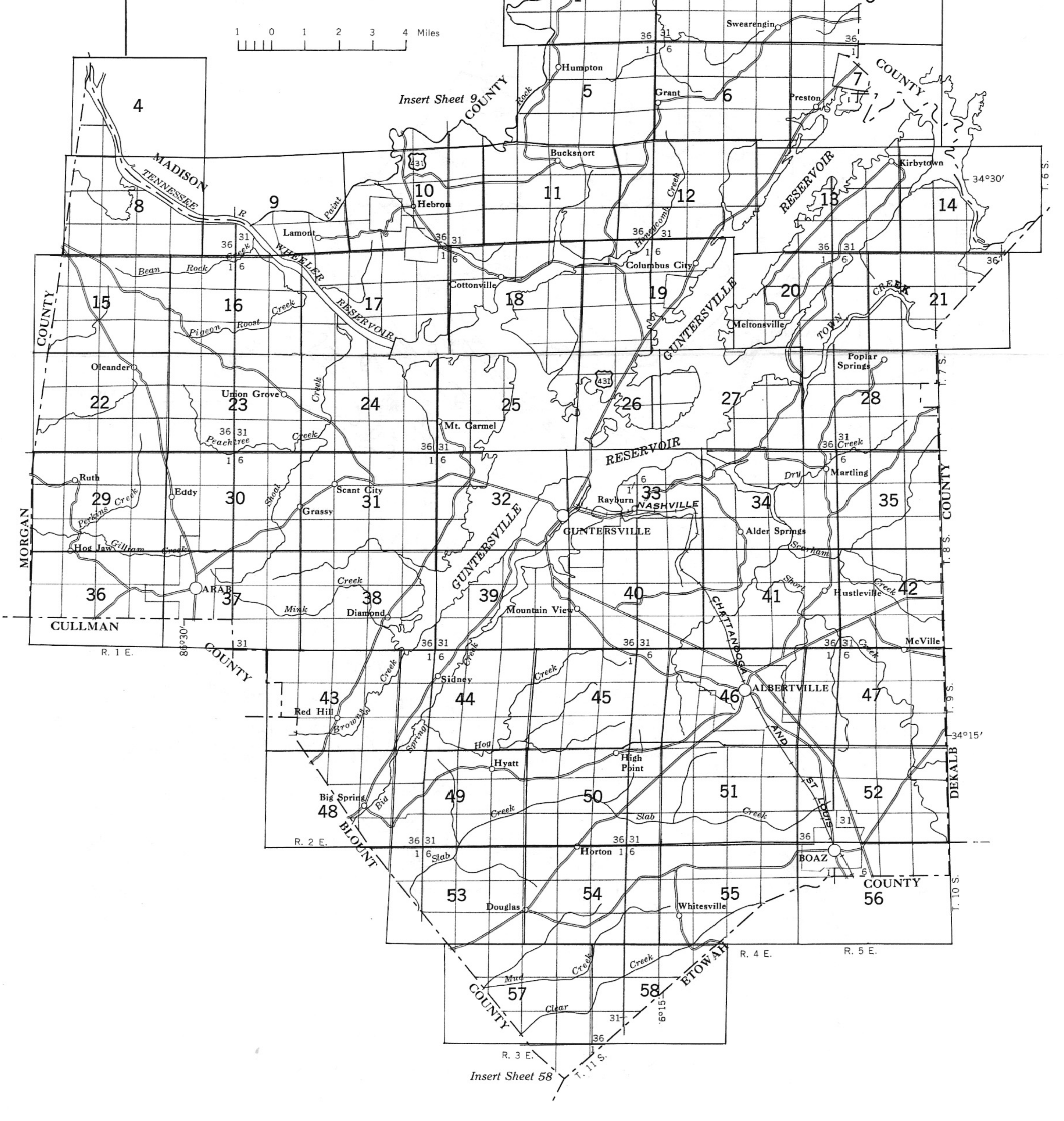
MARSHALL COUNTY, ALABAMA



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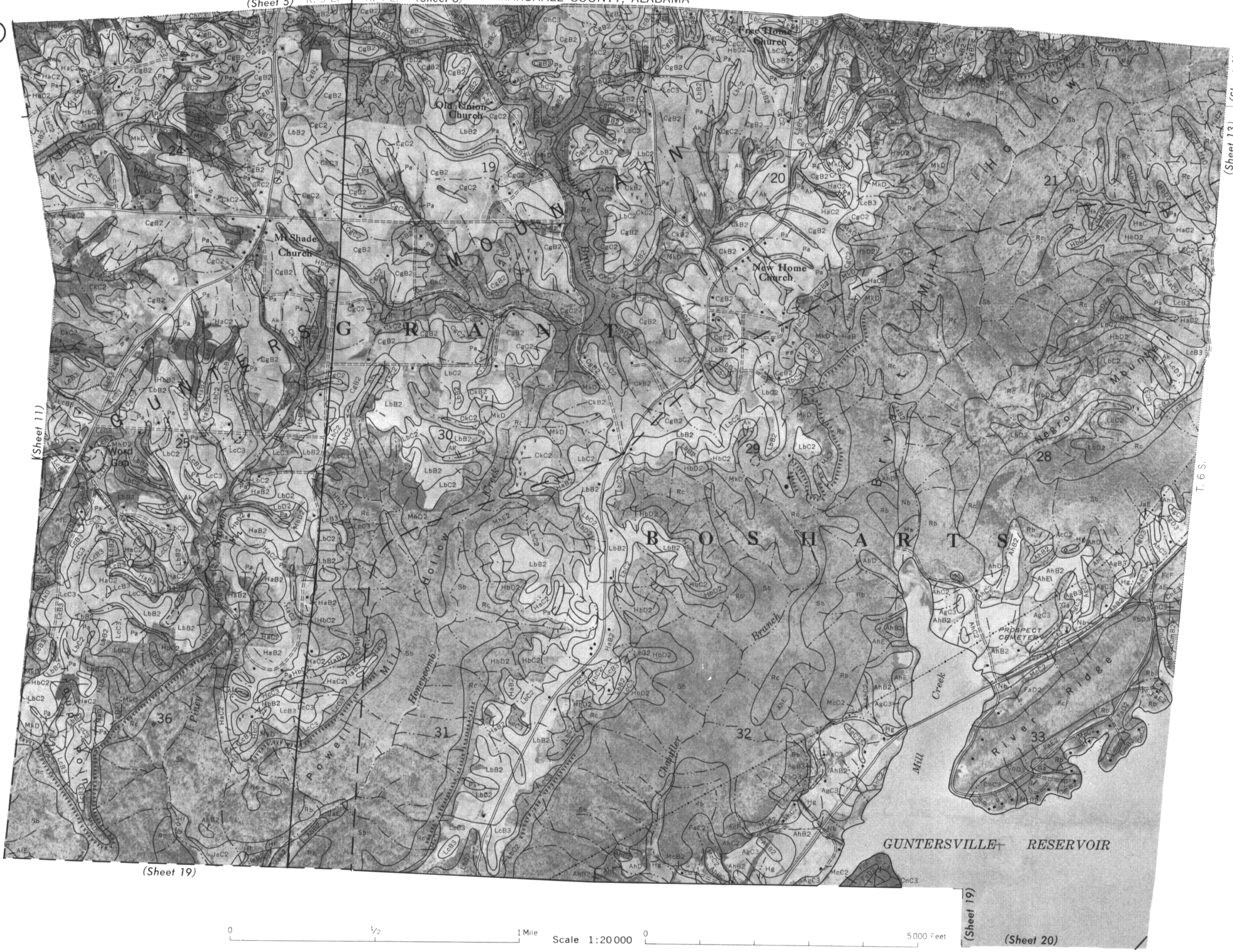

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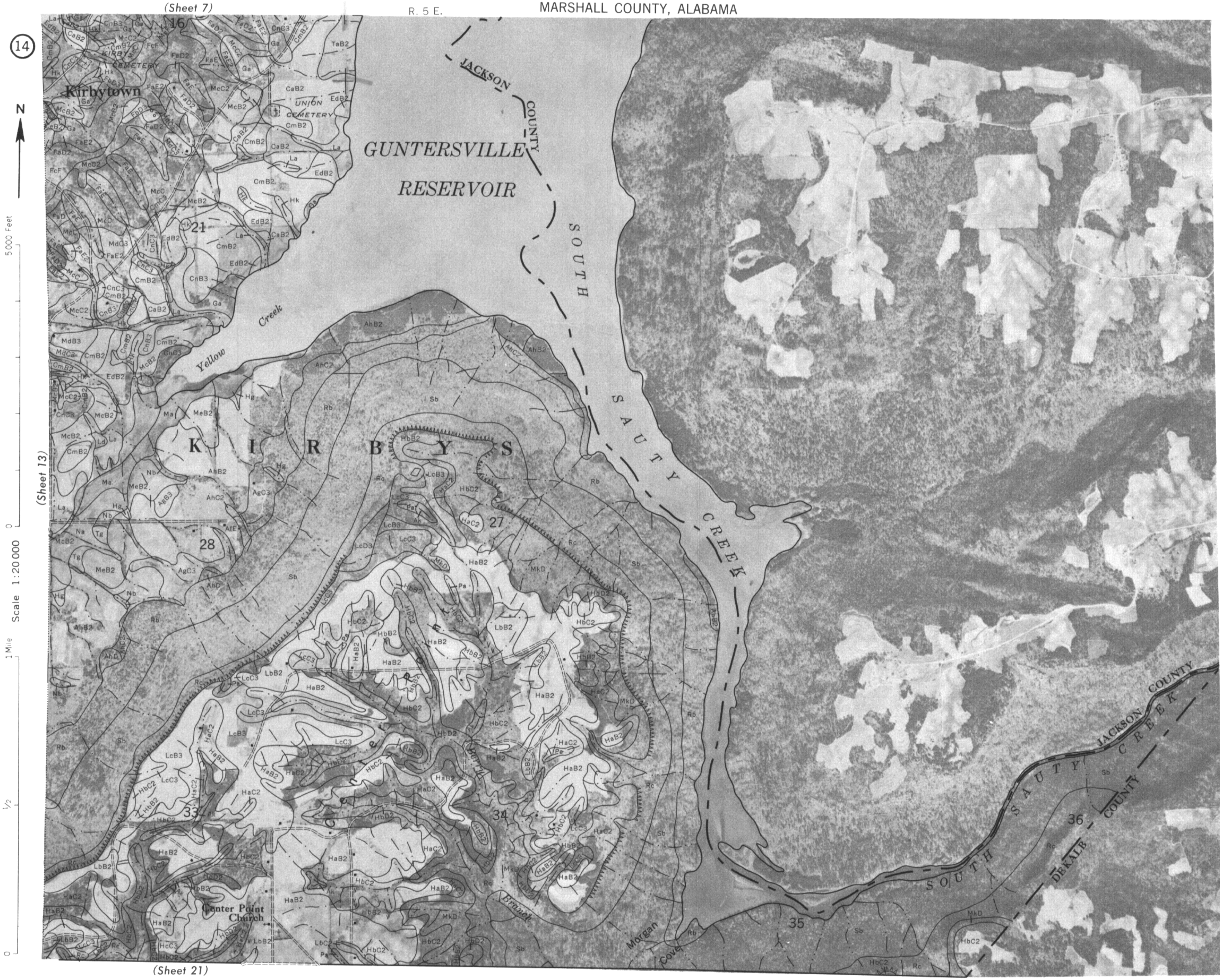

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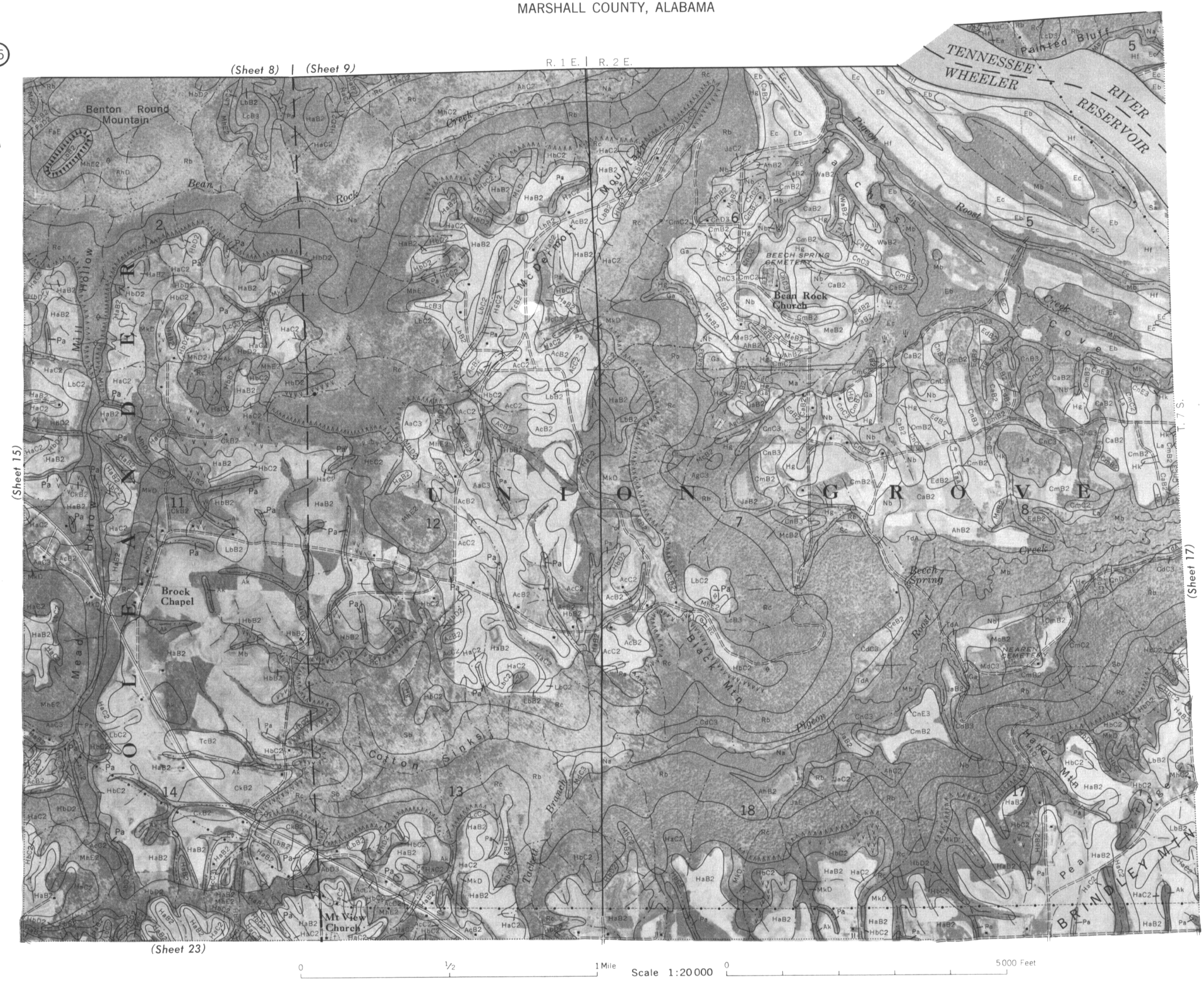

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(Sheet 9) | (Sheet 10) R. 2 E. MARSHALL COUNTY, ALABAMA

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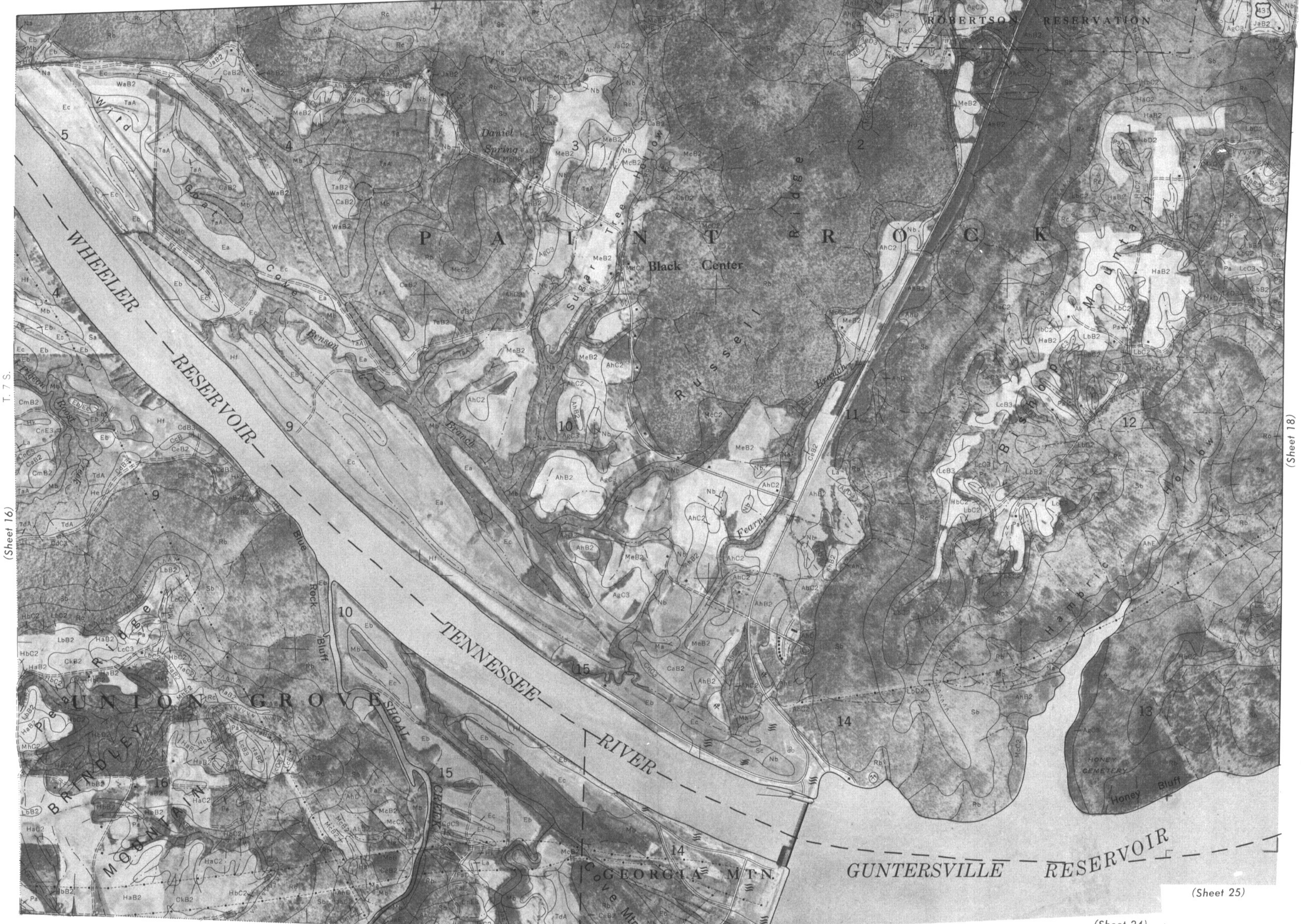

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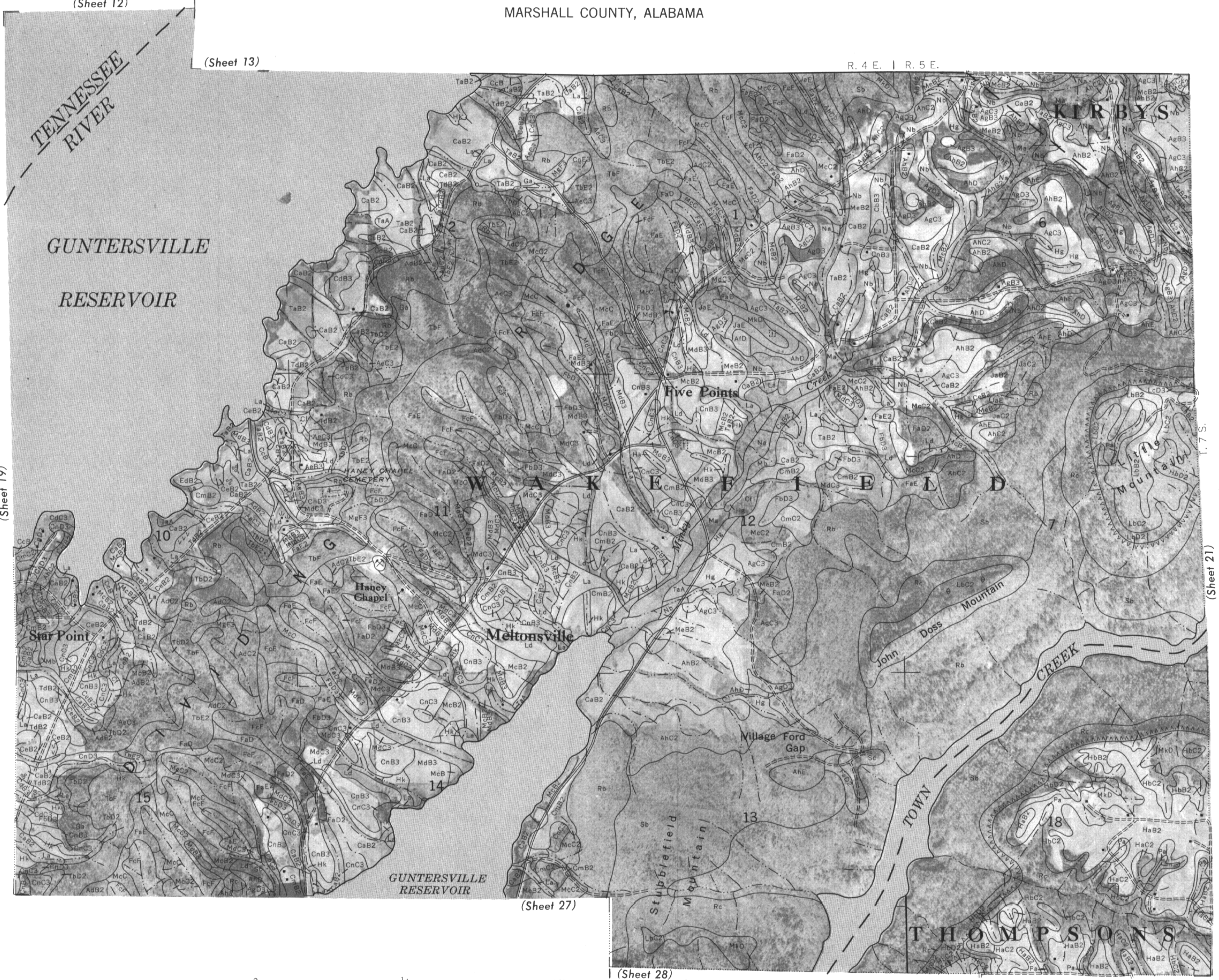

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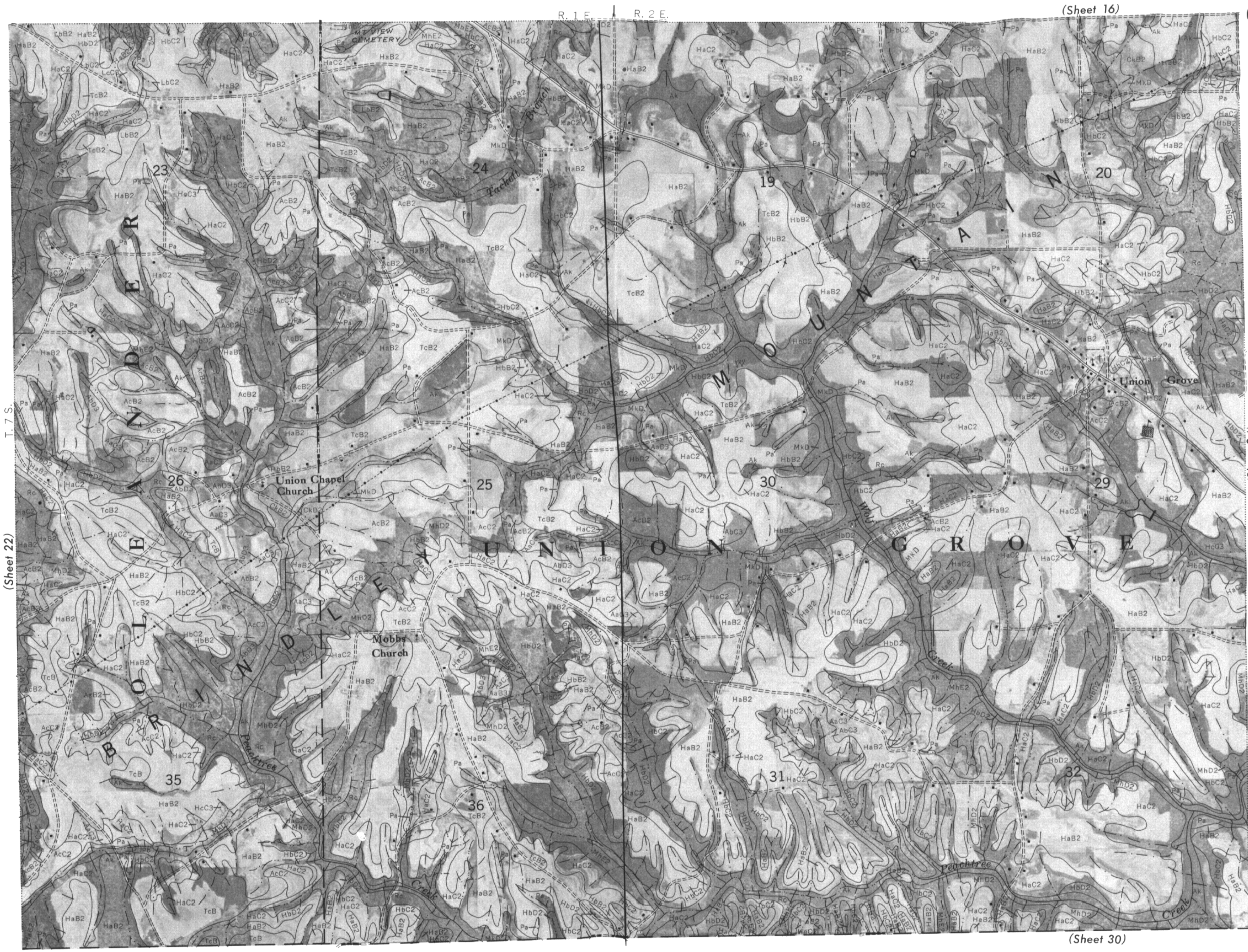

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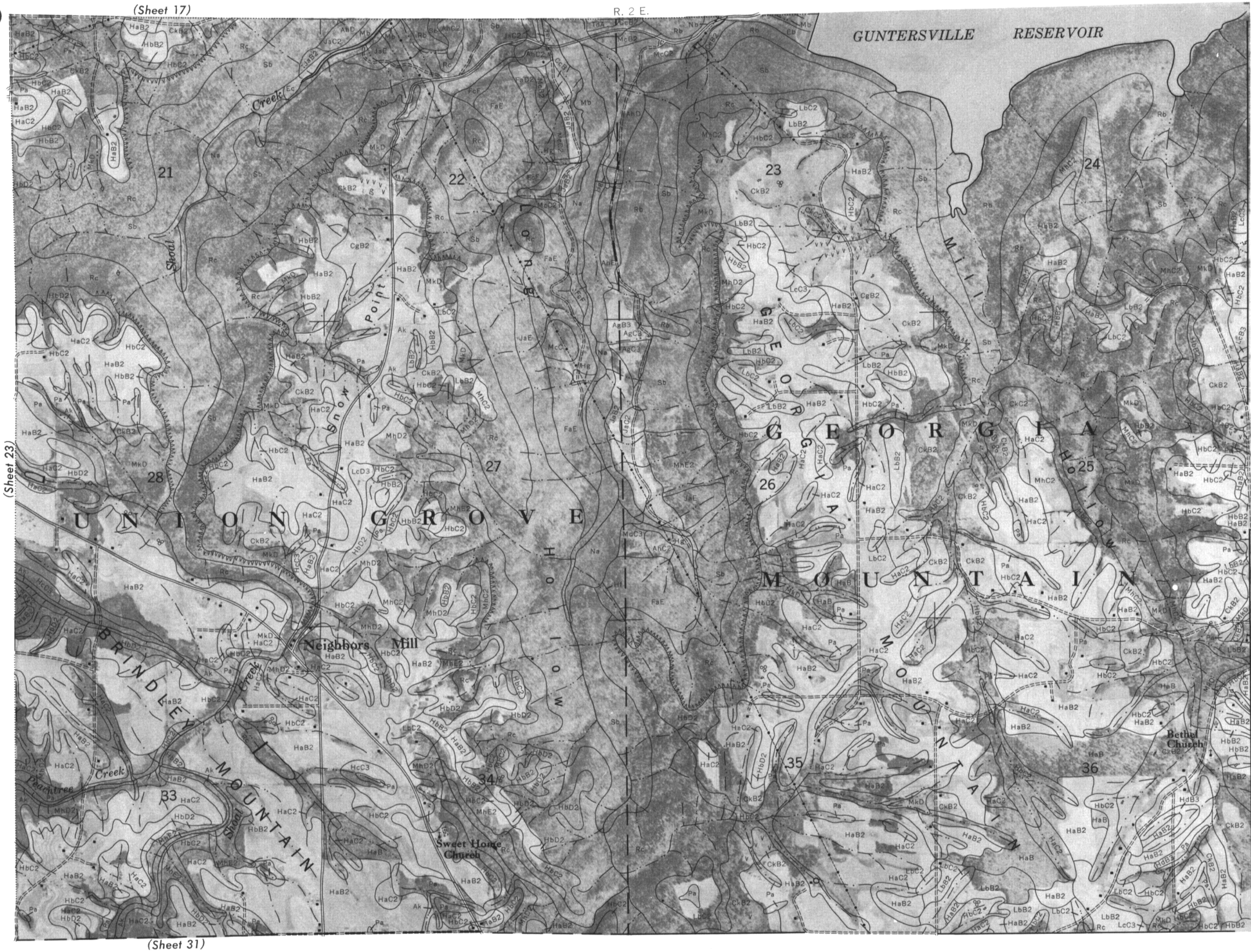

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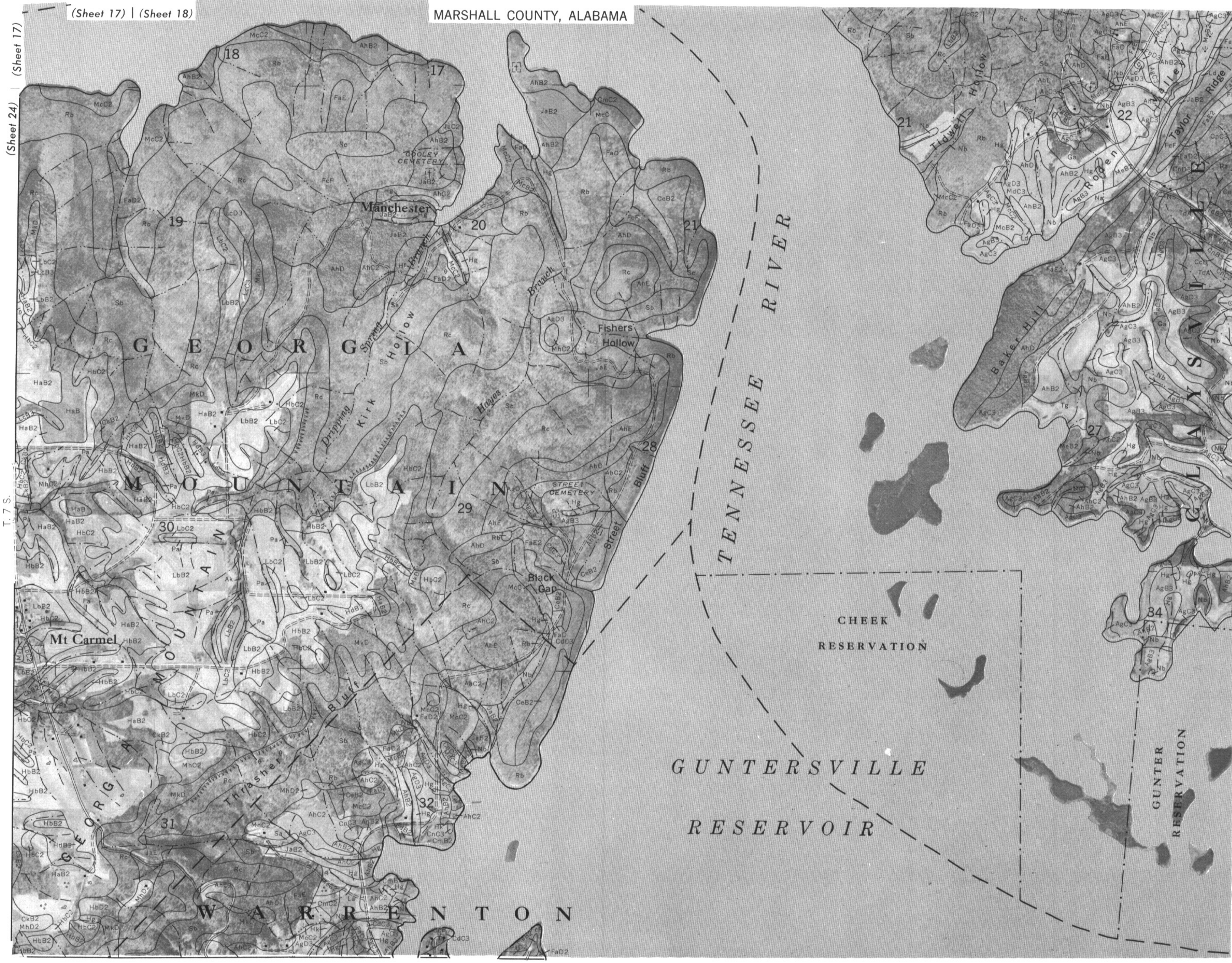

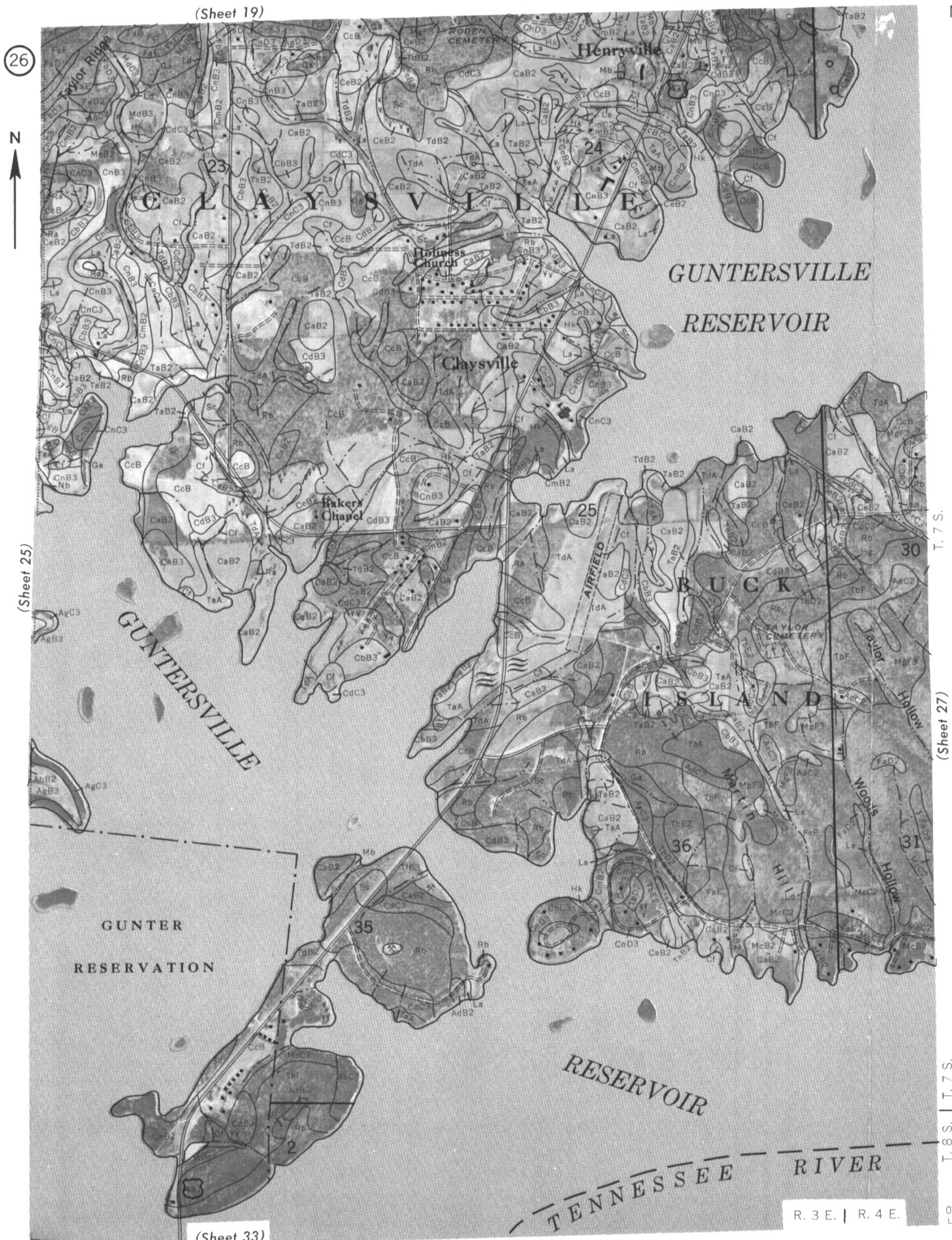

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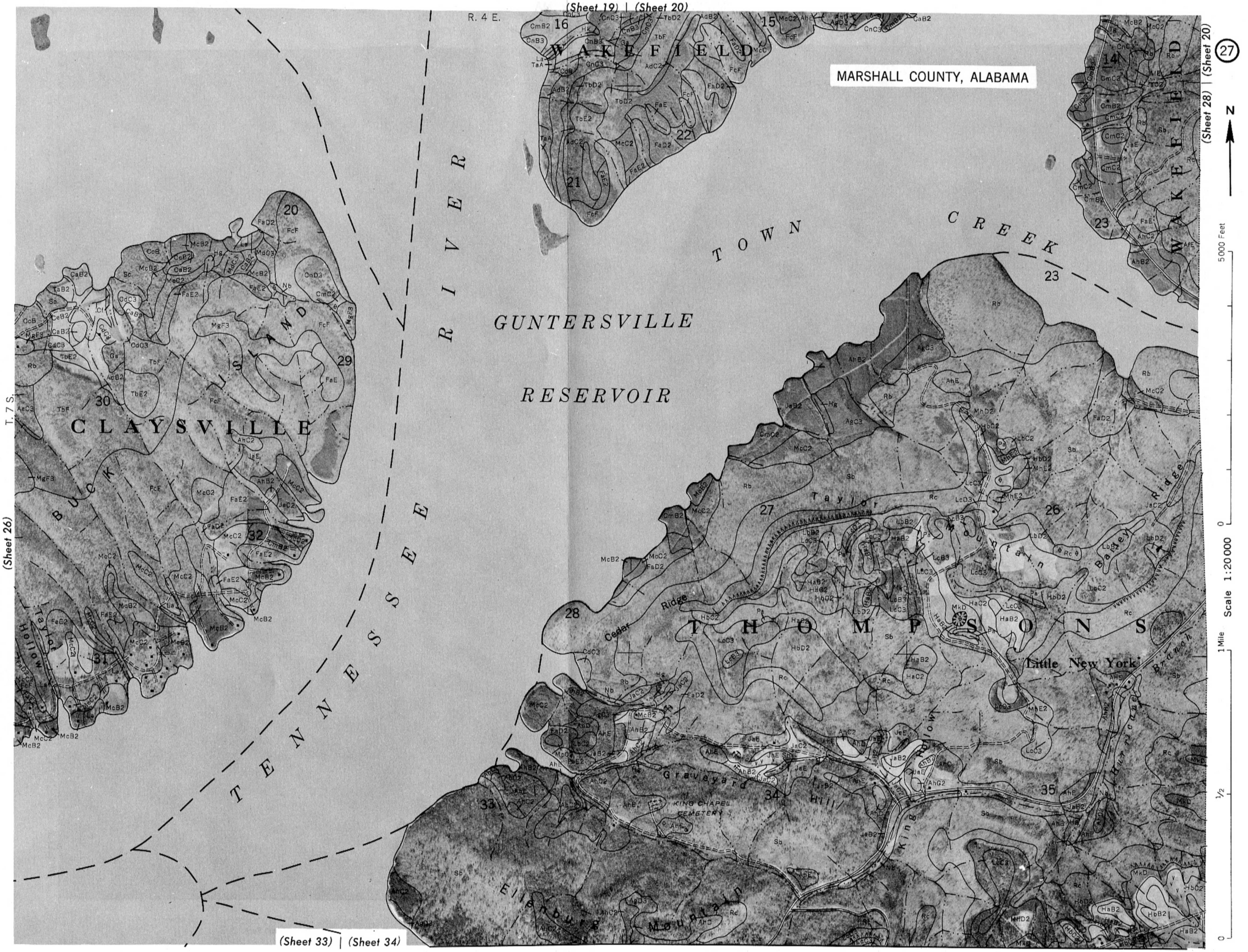

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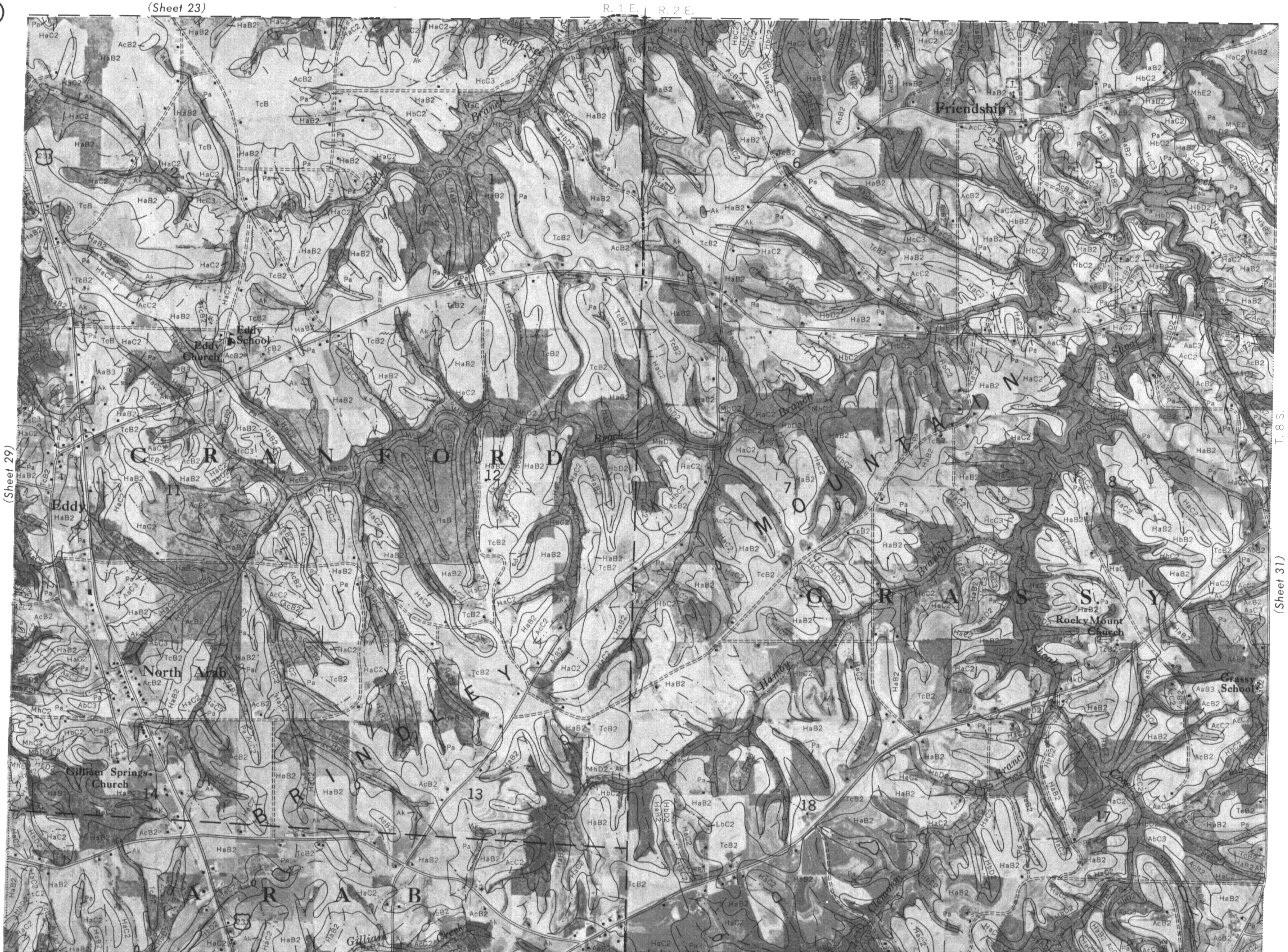

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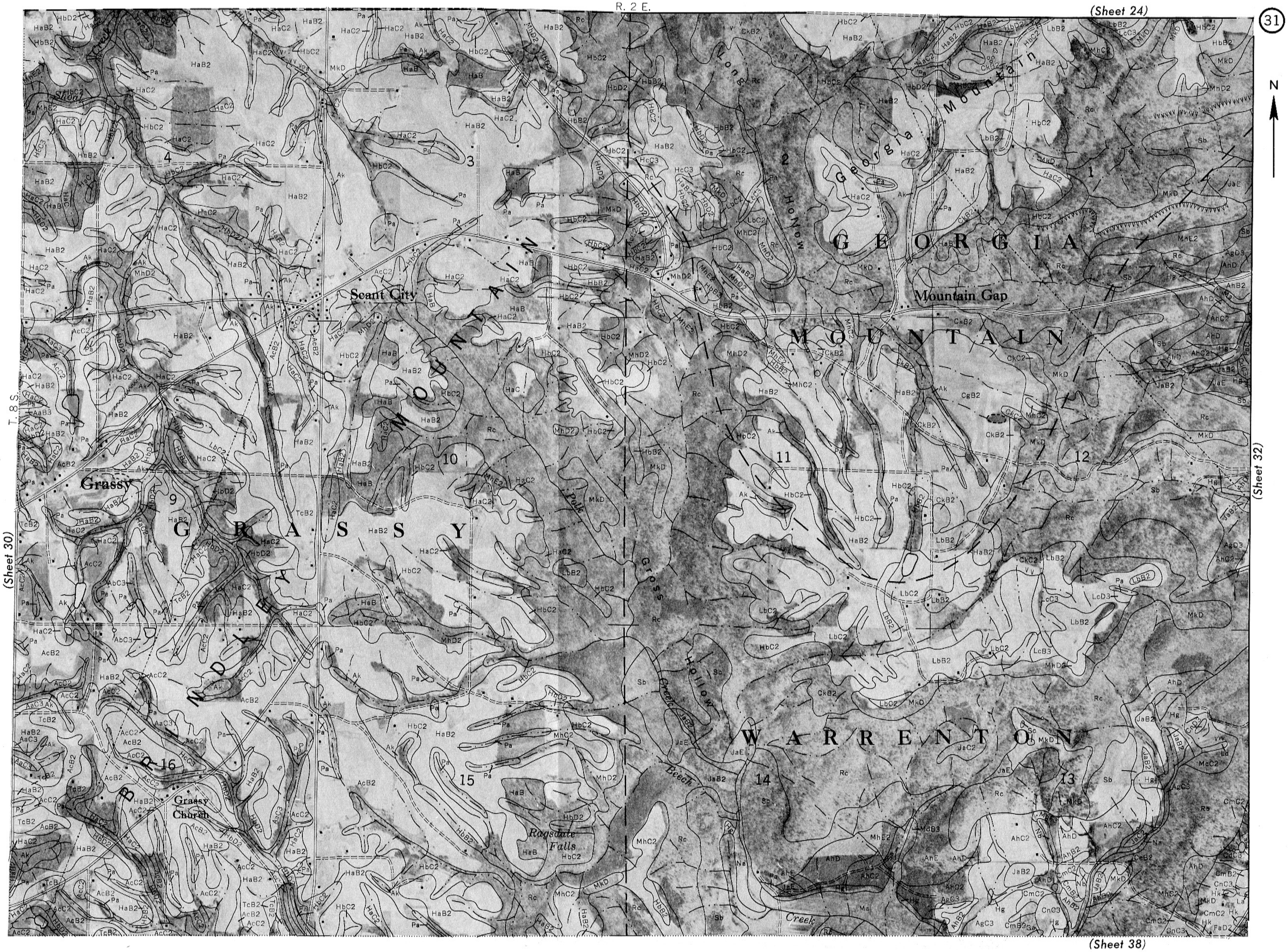

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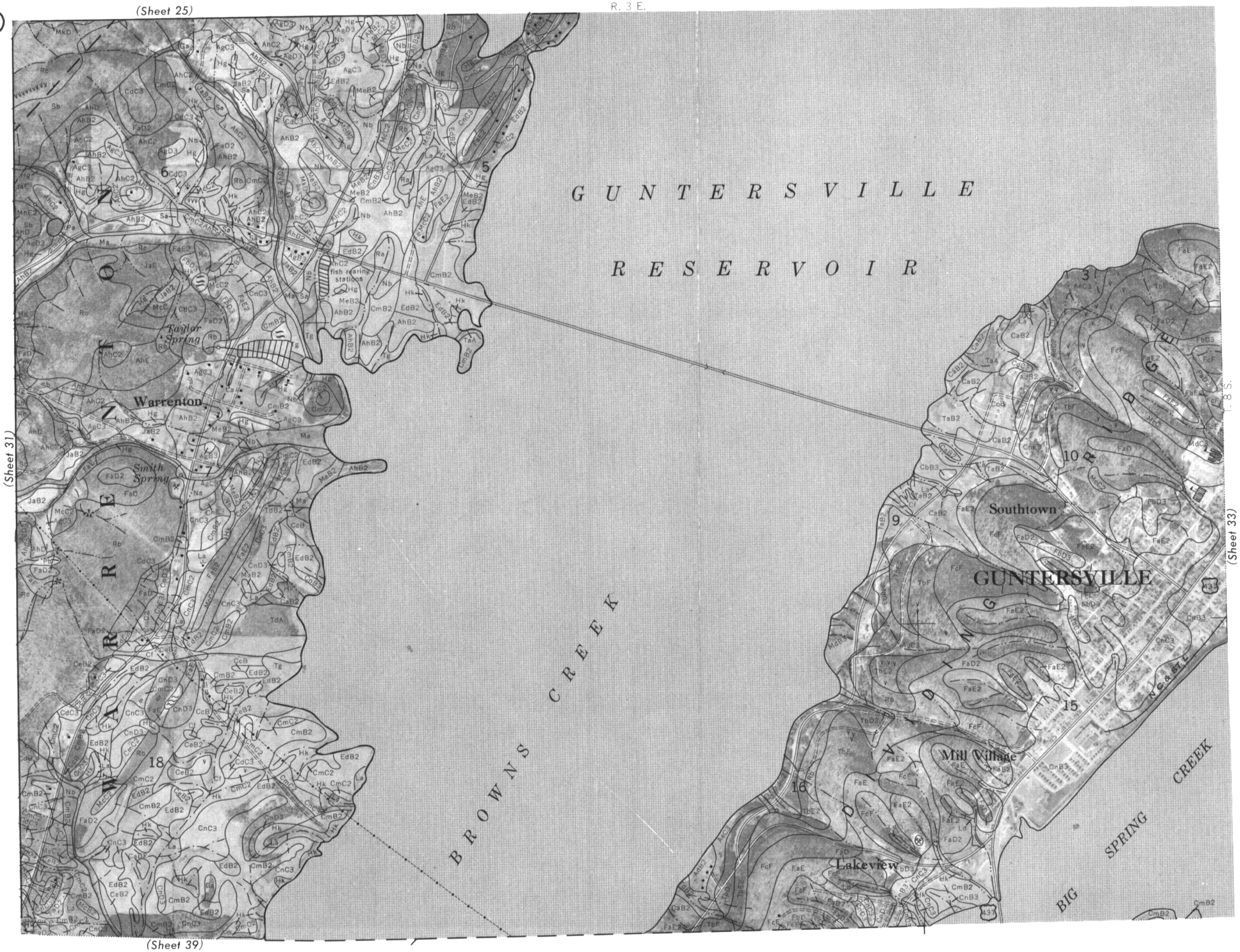

0 1/2 1 Mile Scale 1:20 000 0 5000 Feet

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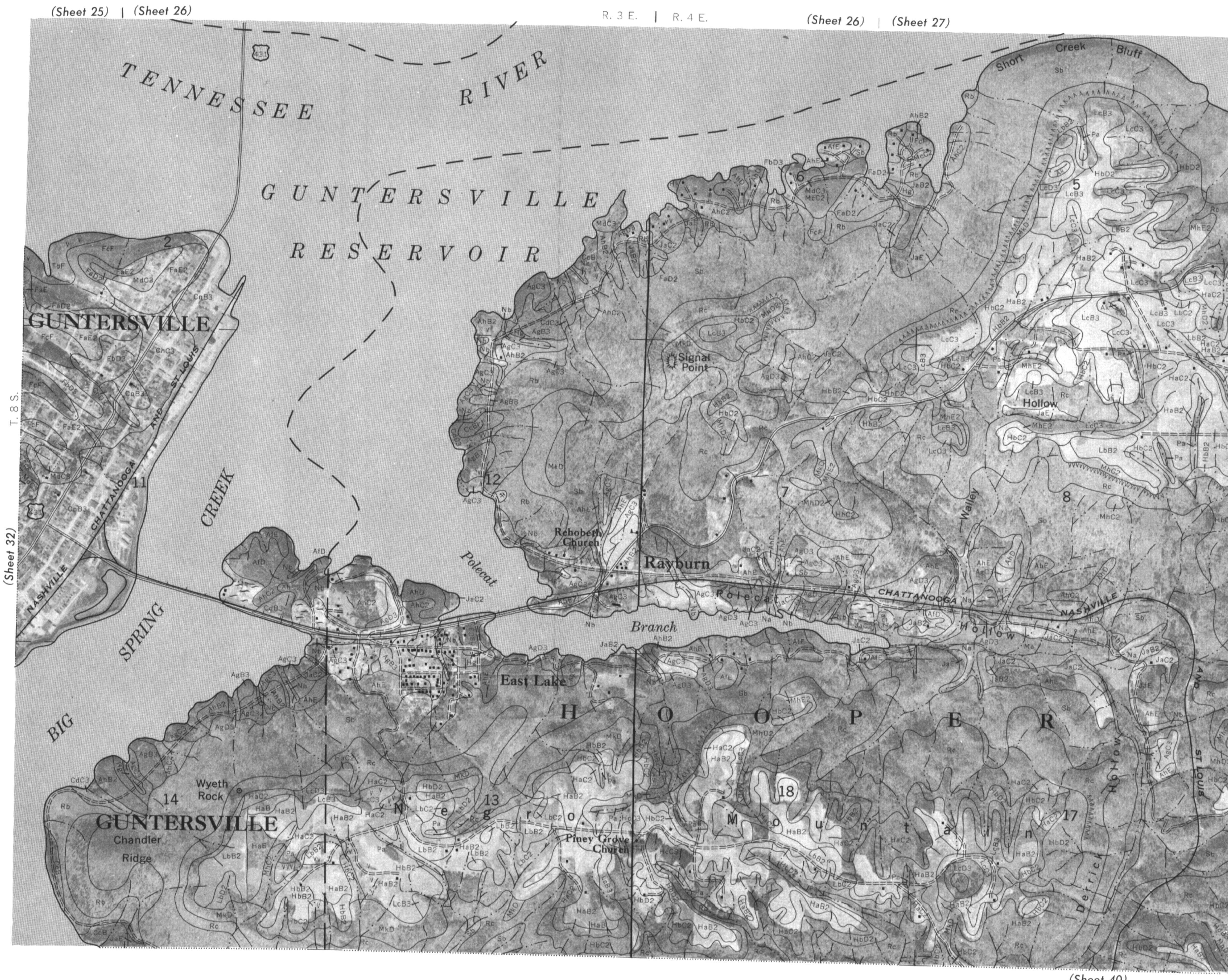

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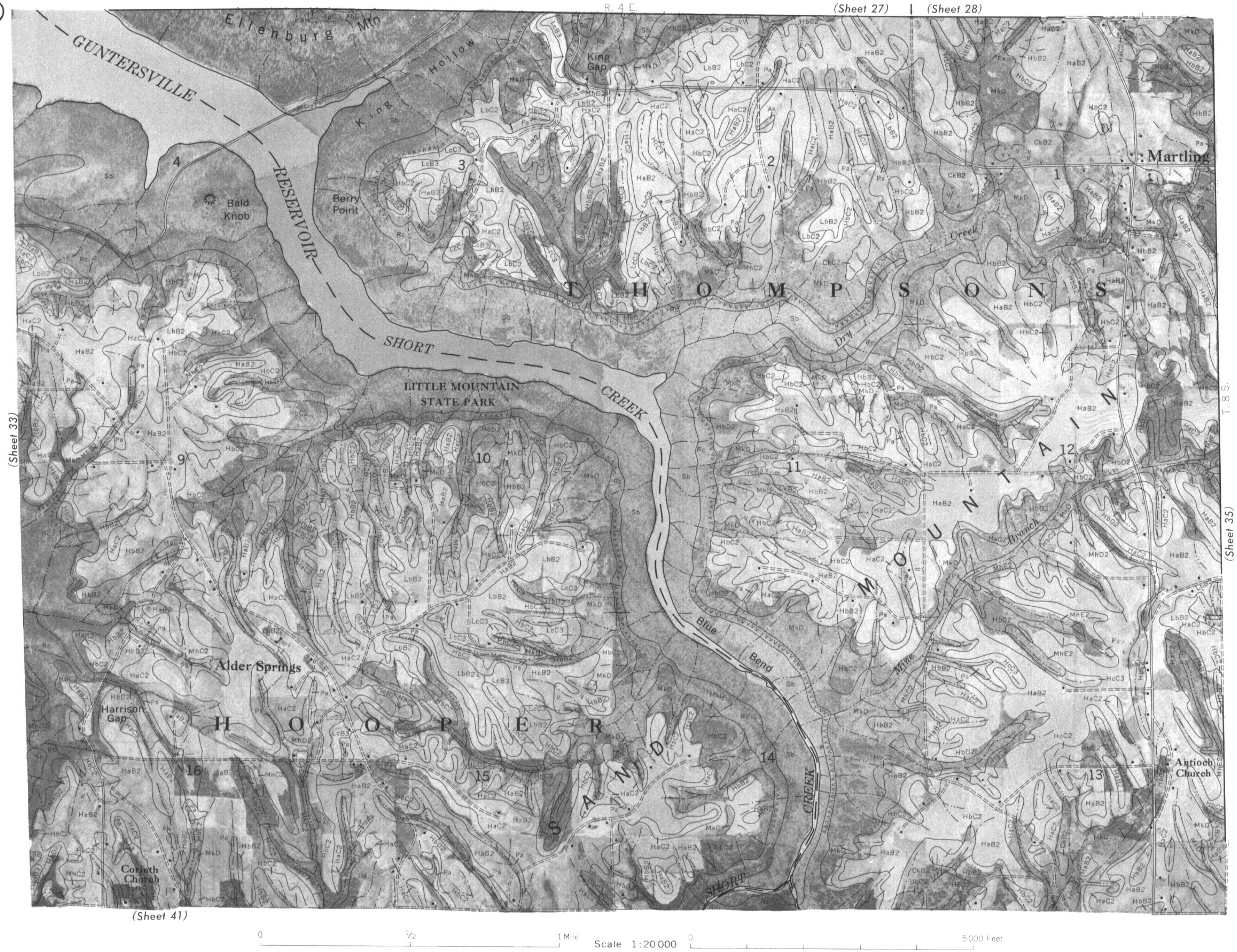
0 1/2 1 Mile Scale 1:20000 0 5000 Feet



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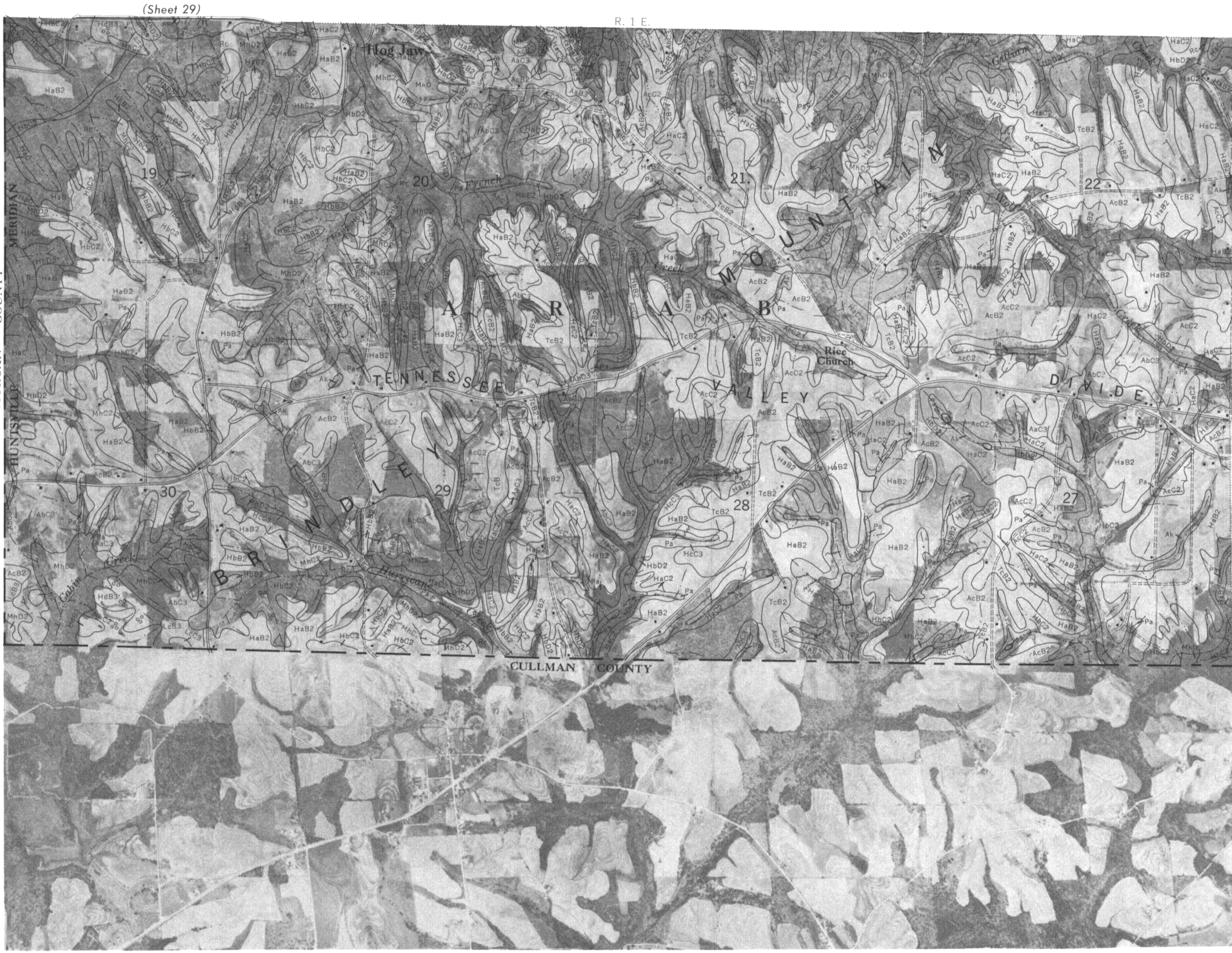
36



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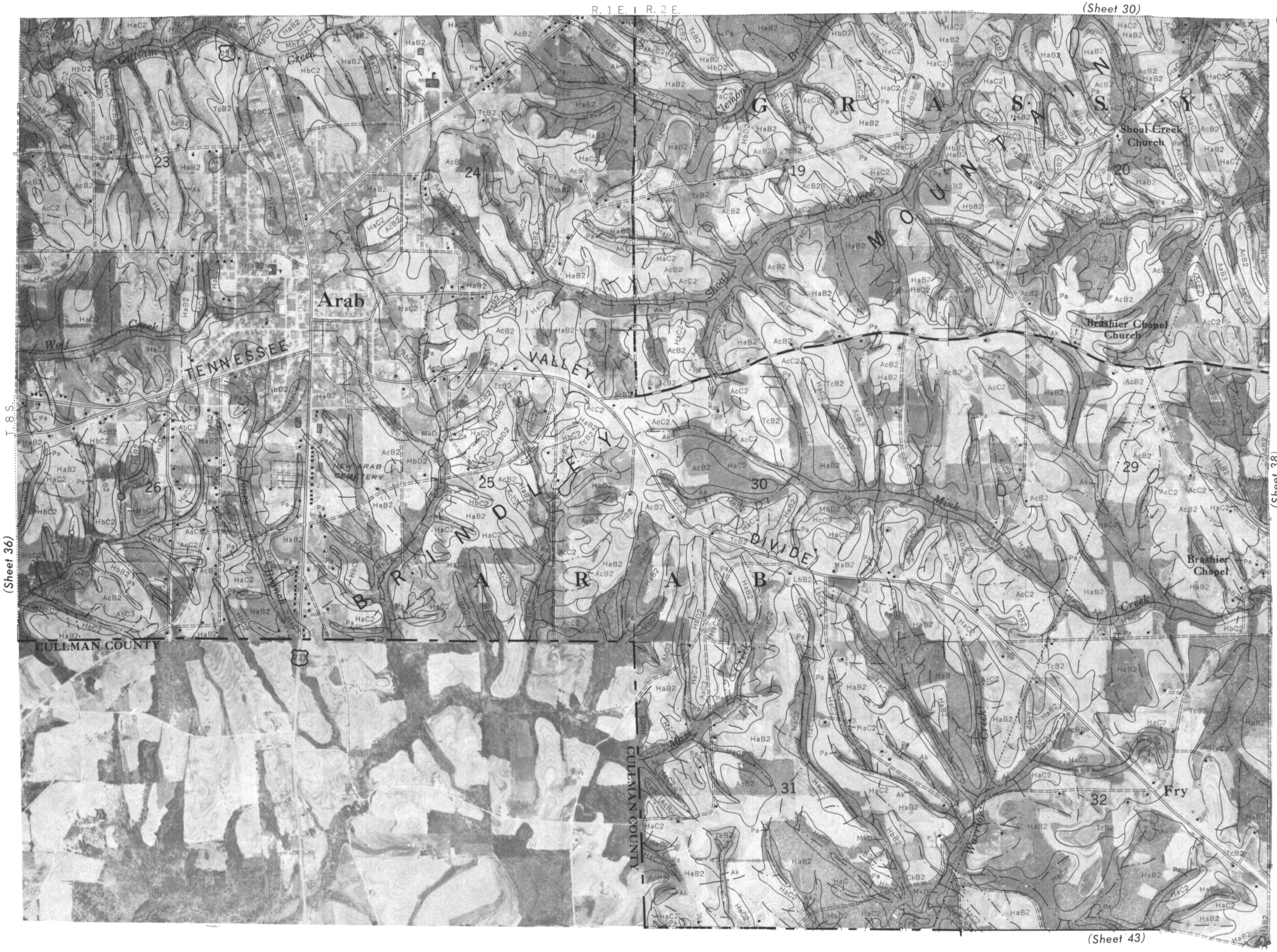

0 1/2 1 Mile Scale 1:20 000 0 5000 Feet

(Sheet 31)

R. 2 E.

(Sheet 37)

T. 8 S.

(Sheet 39)

(Sheet 43) | (Sheet 44)

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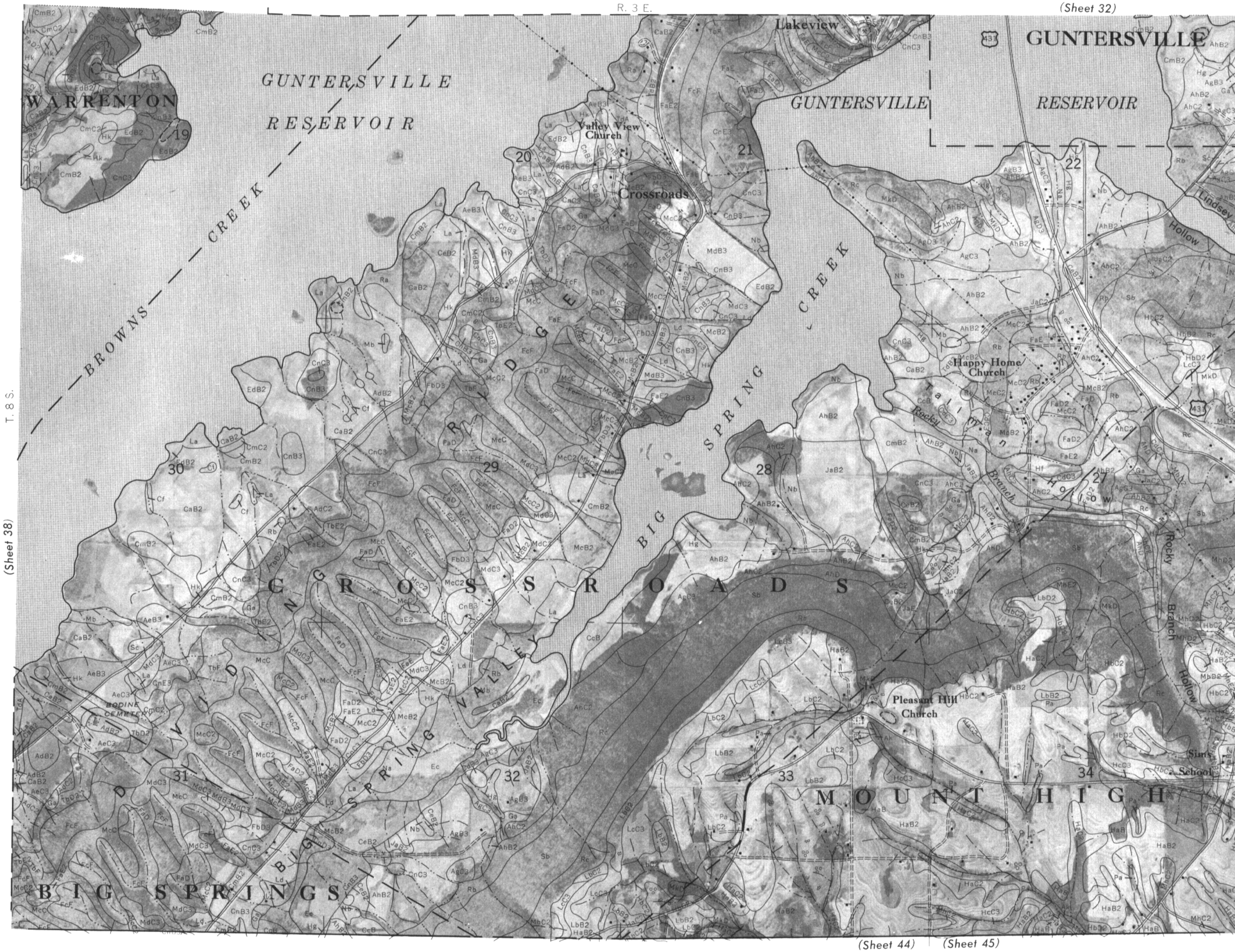

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

4

N

(Sheet 8)

R. 1 E.

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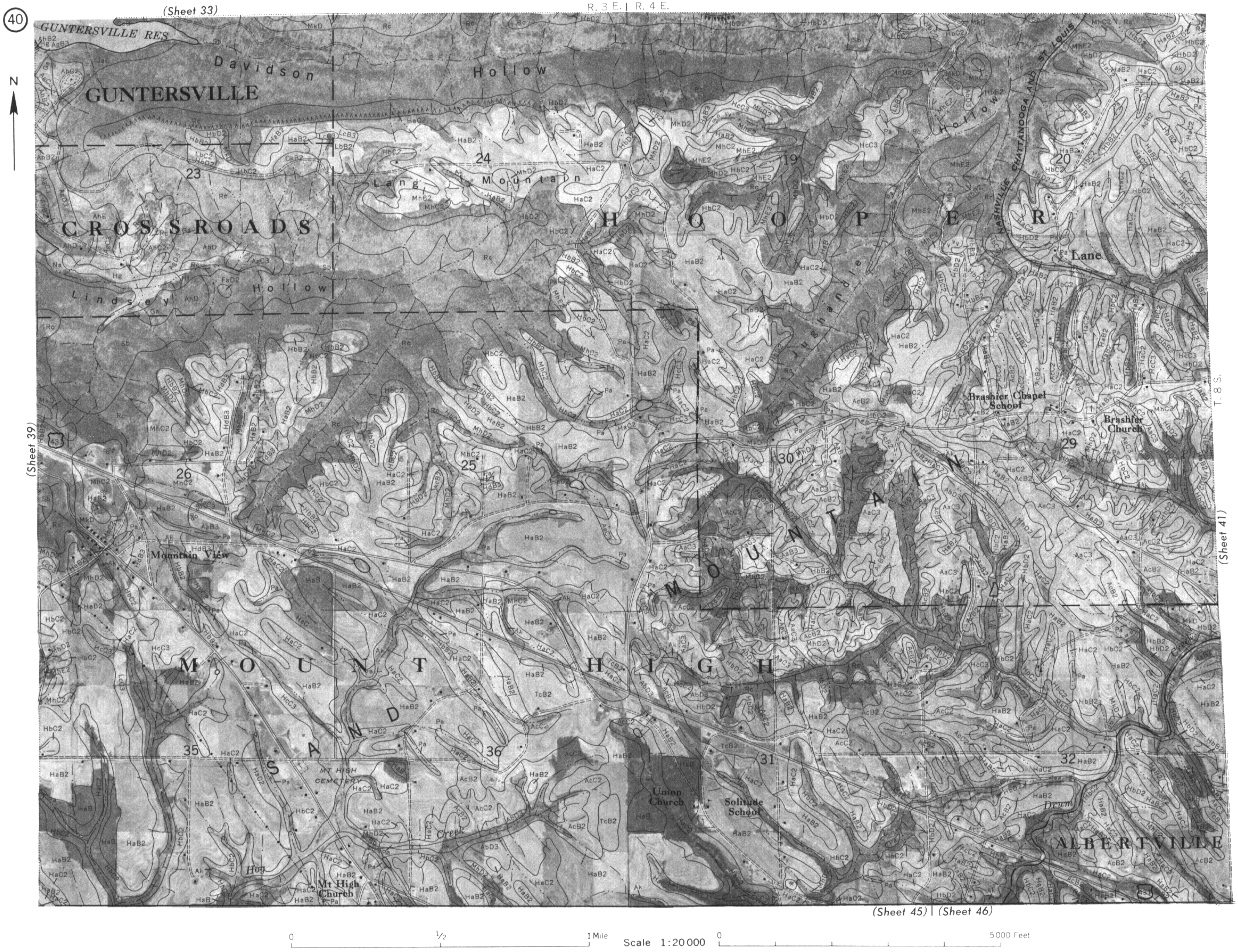

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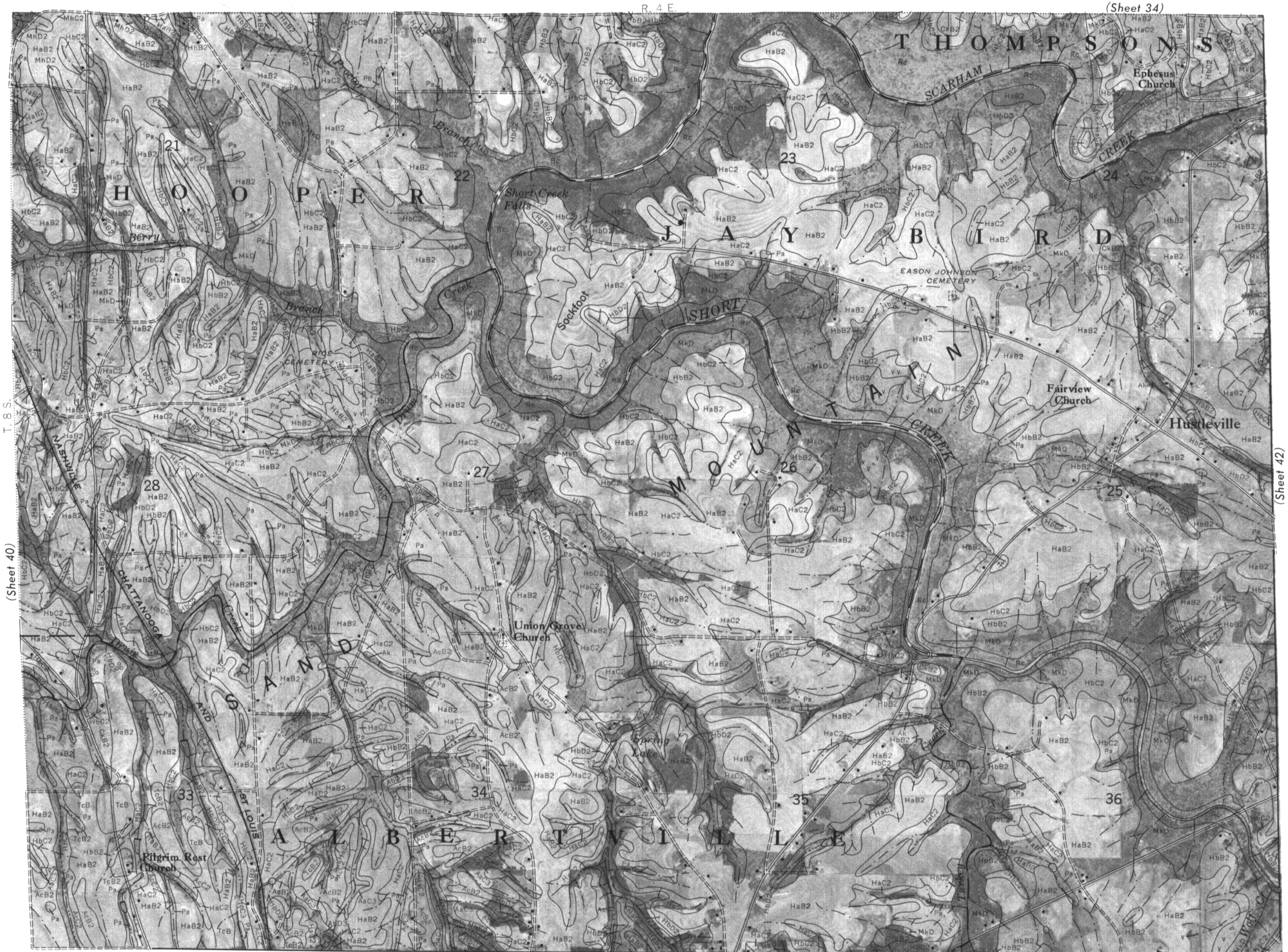
(Sheet 34)



(Sheet 40) (Sheet 42)

(Sheet 46) | (Sheet 47)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

0 — 1/2 — 1 Mile Scale 1:20 000 0 — 5000 Feet

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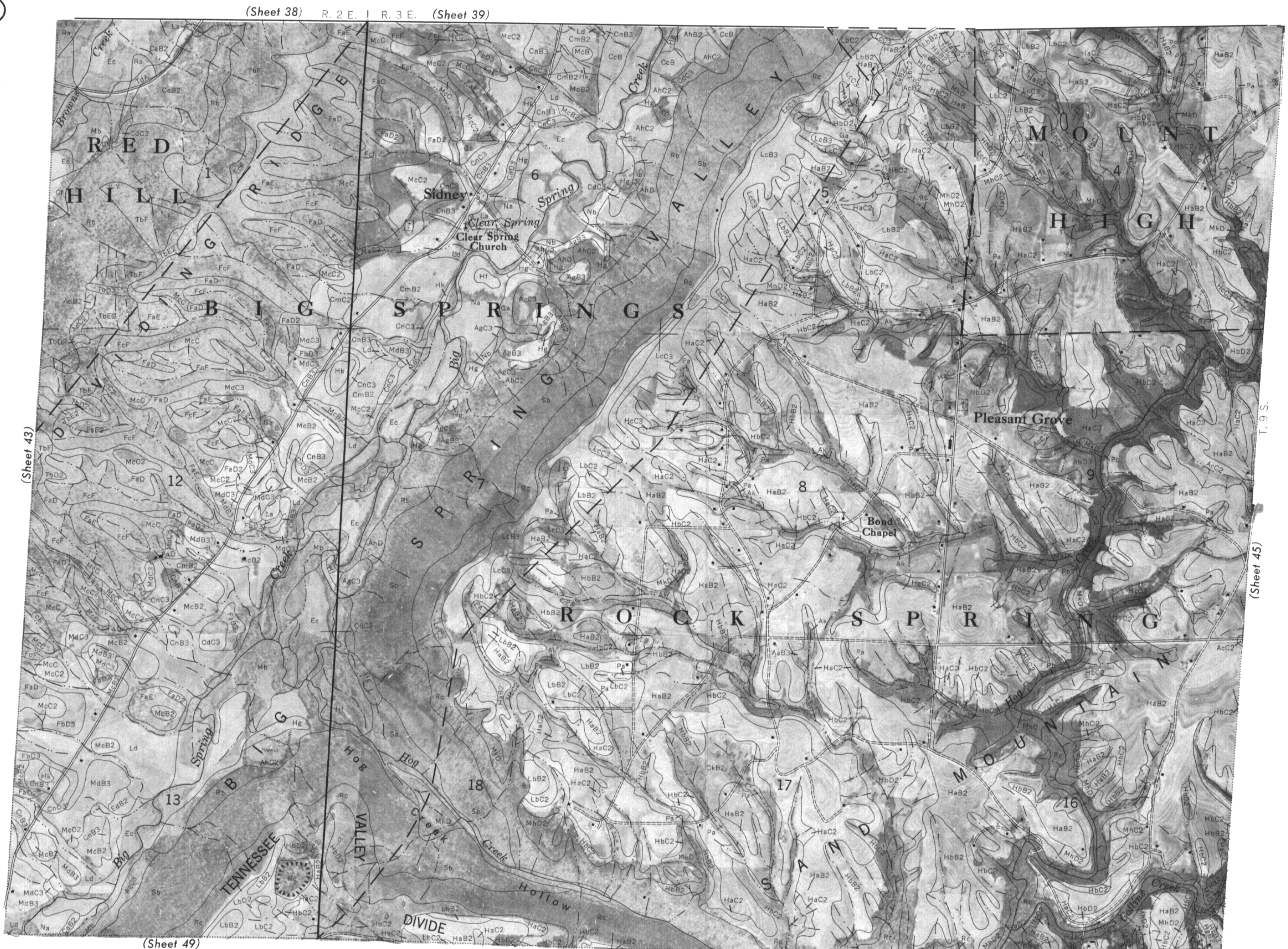

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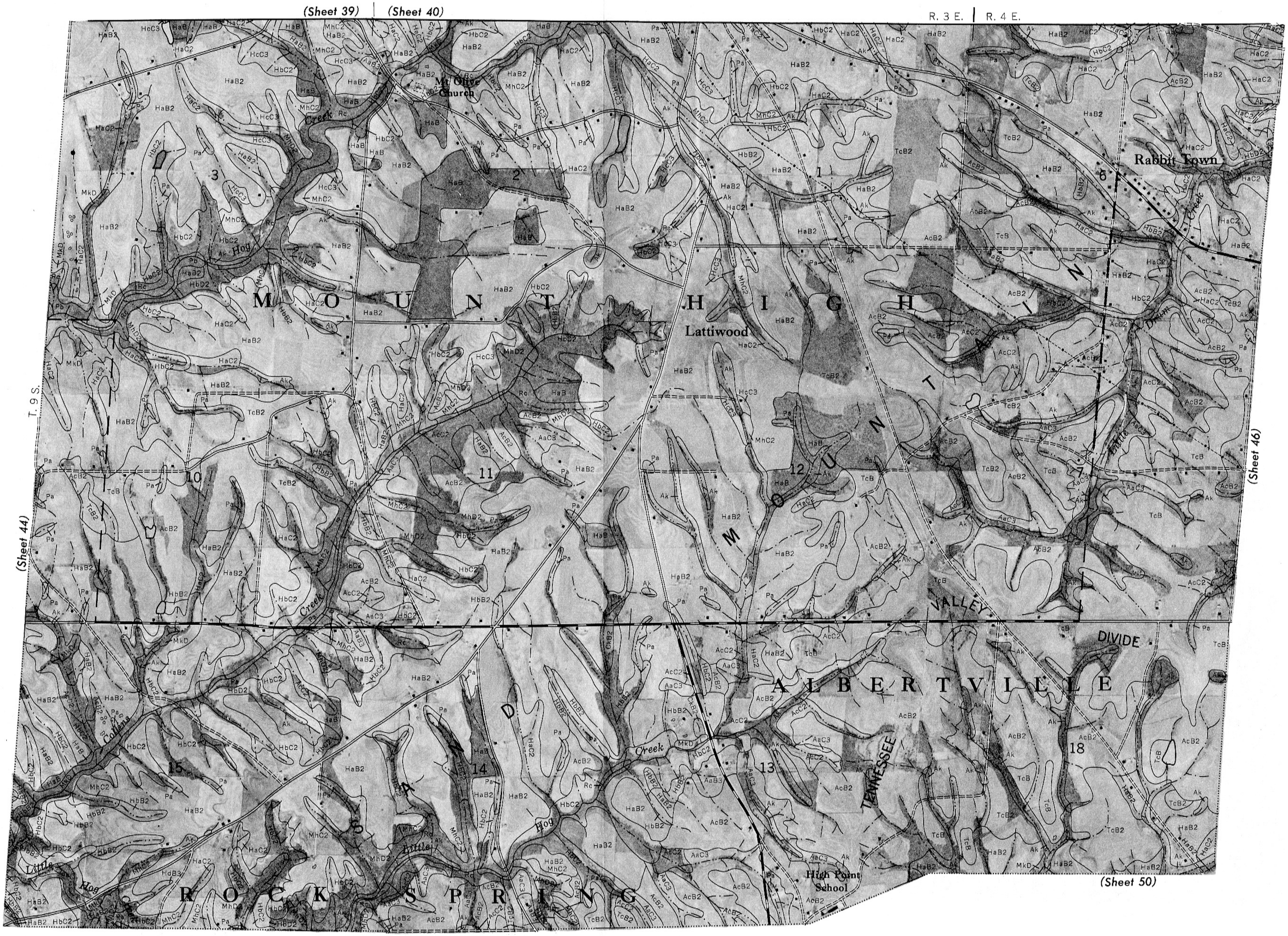

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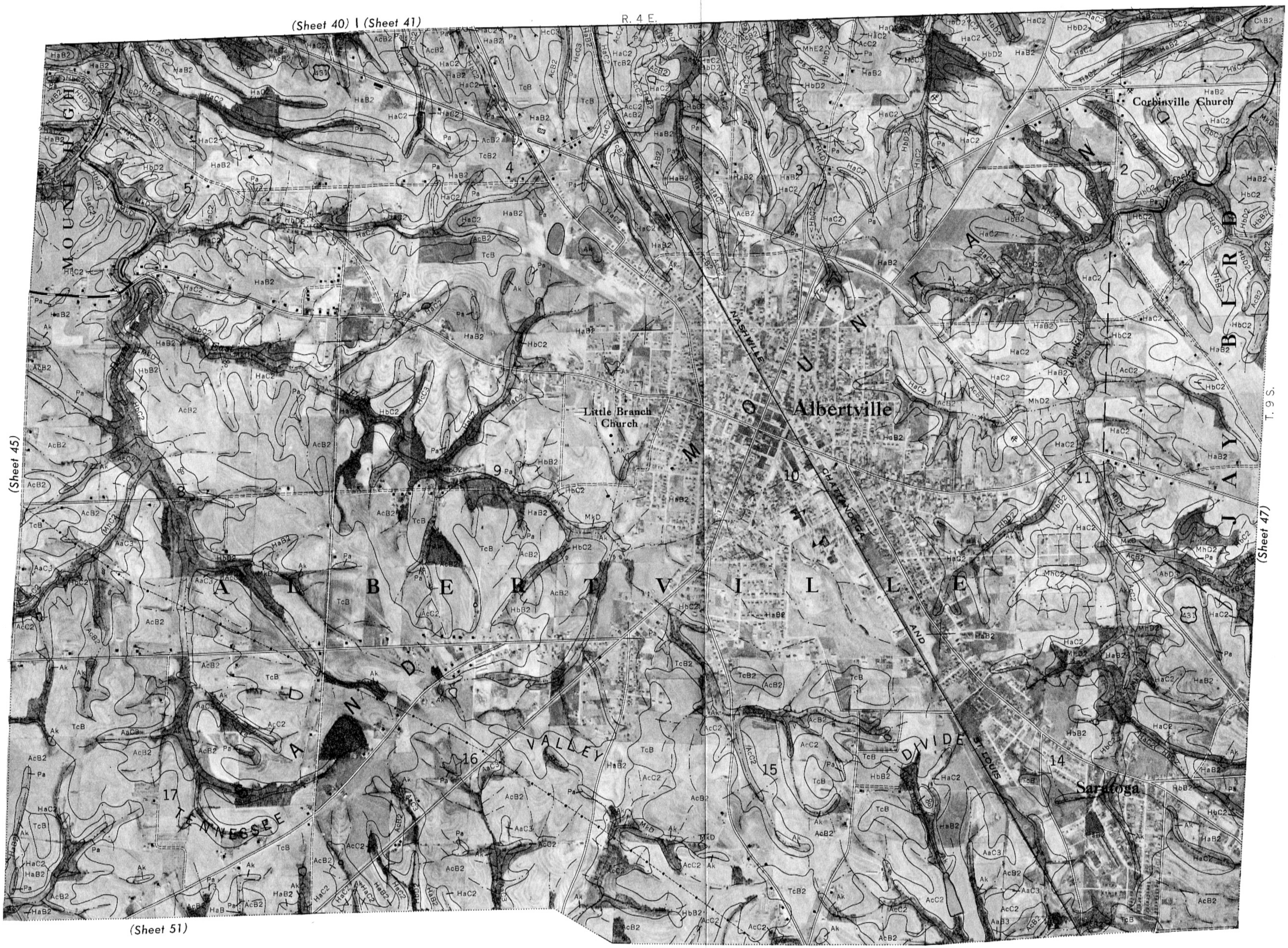

Scale 1:20 000

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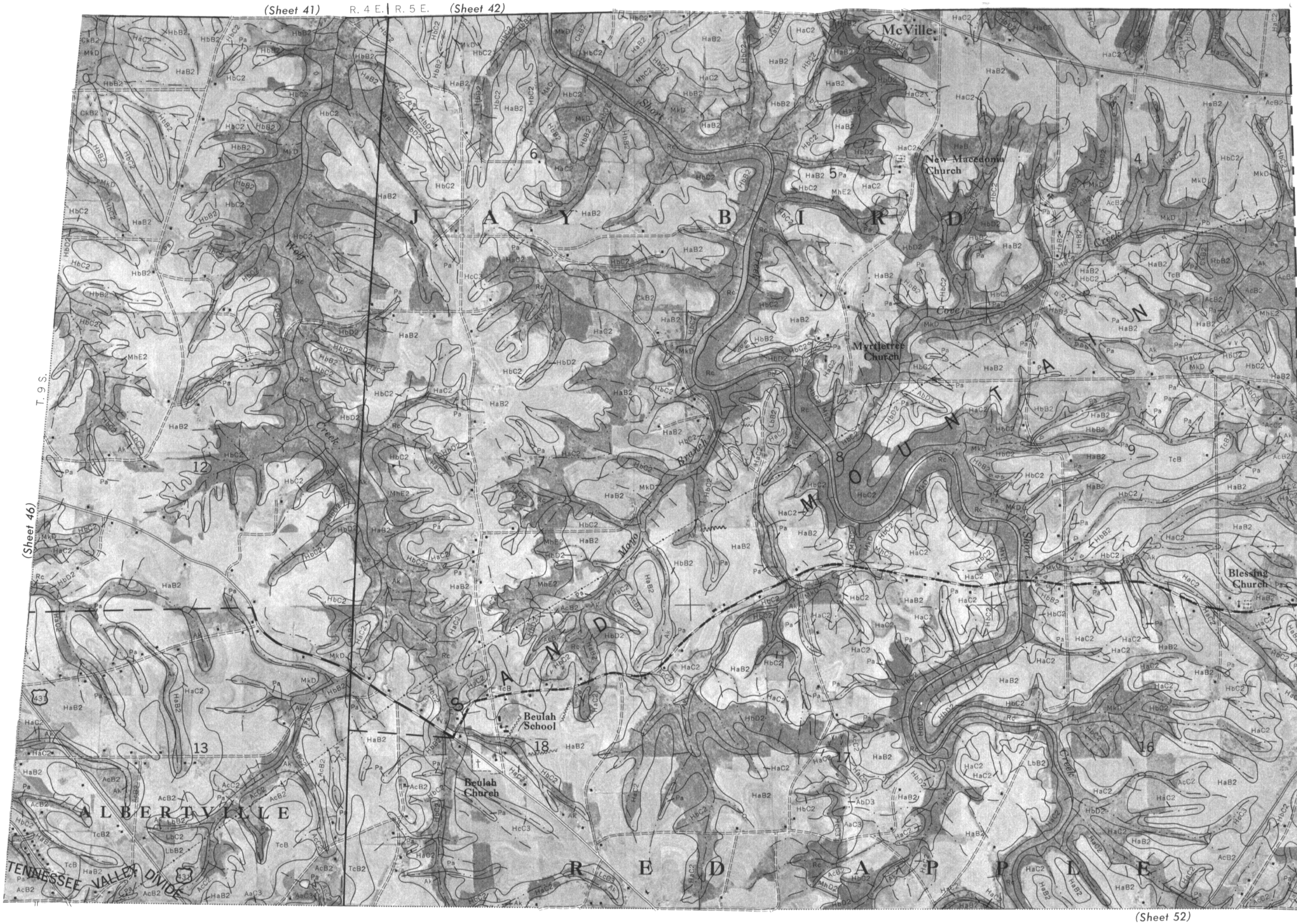

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

N

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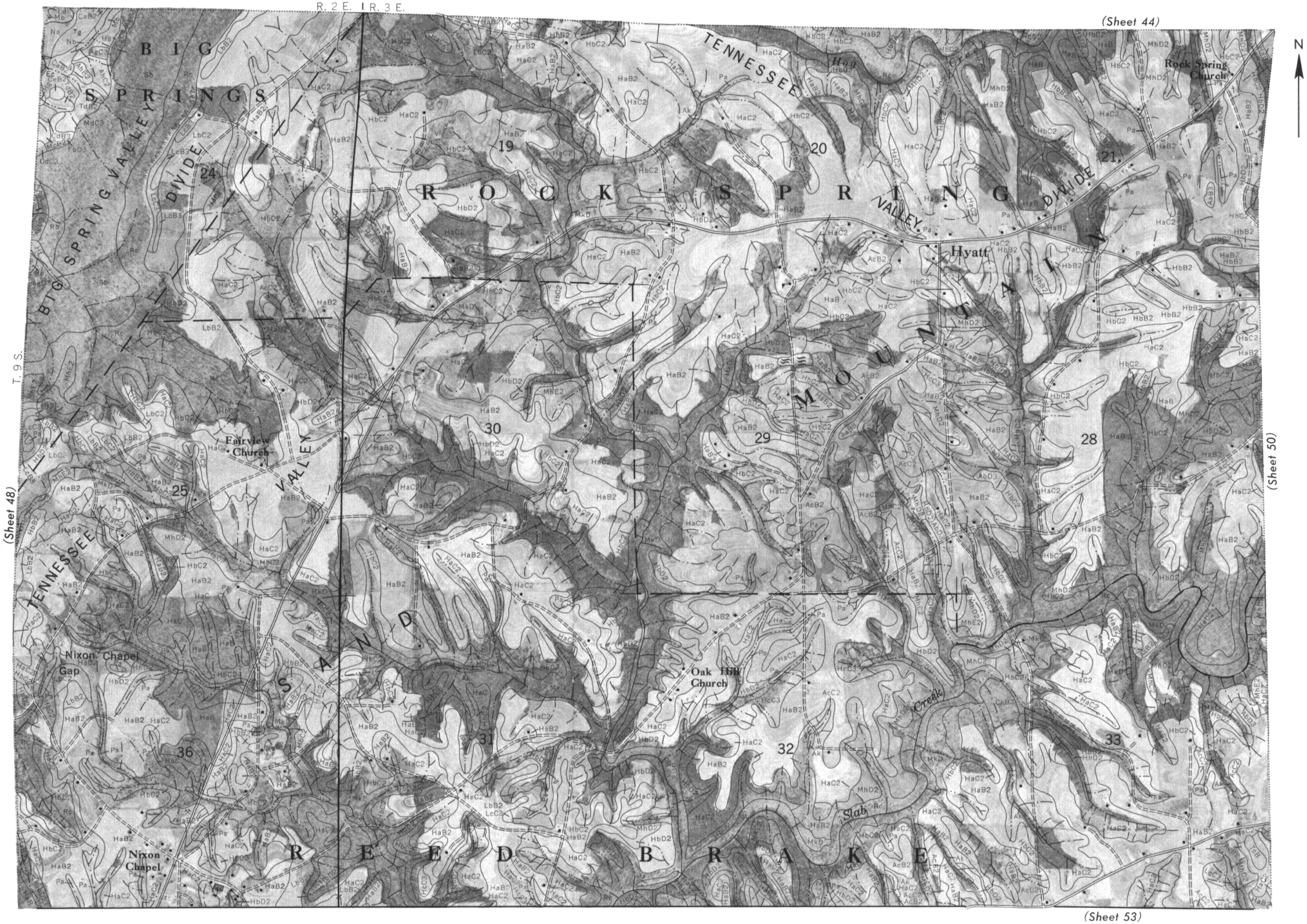

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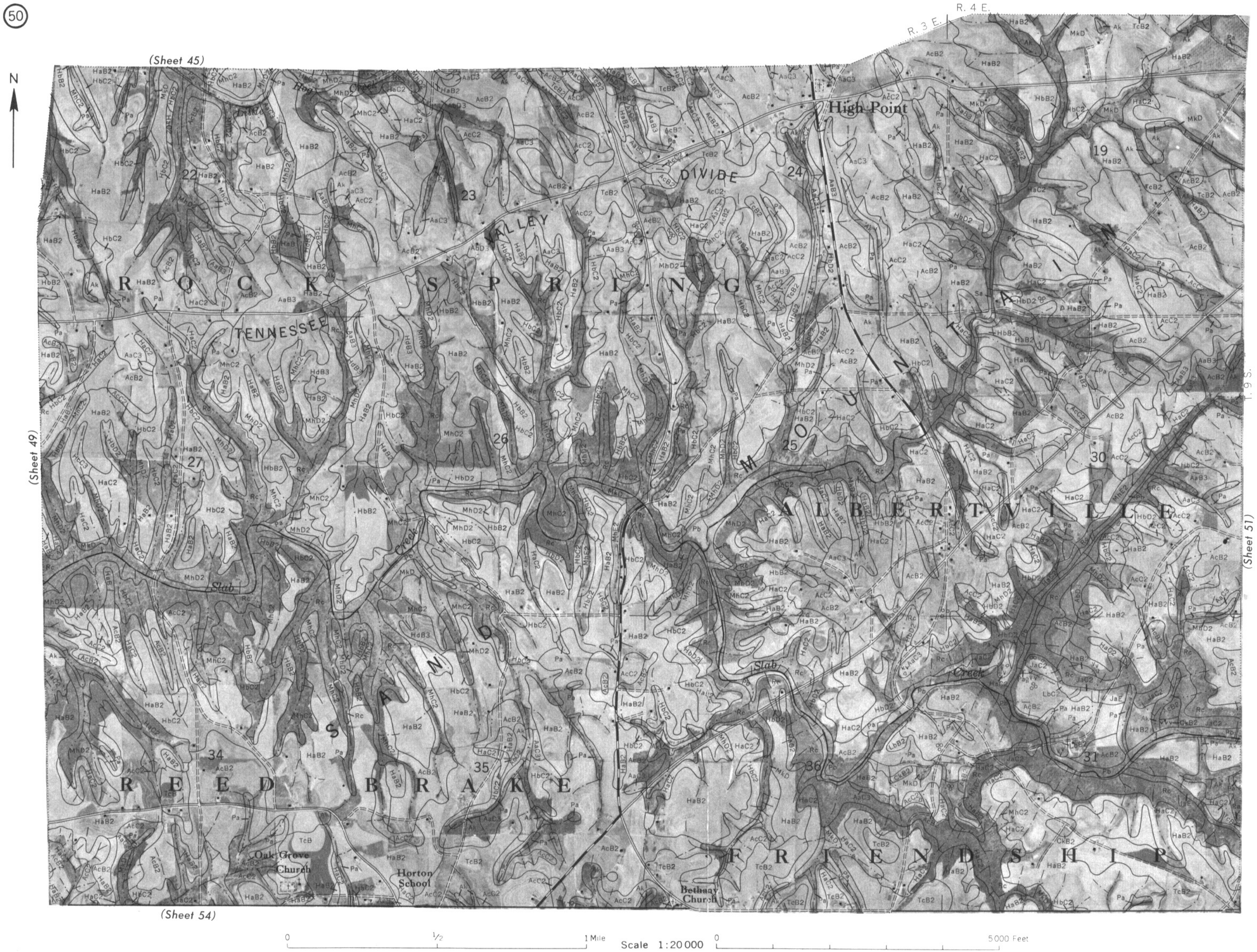
0 1/2 1 Mile Scale 1:20 000 0 5000 Feet



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51

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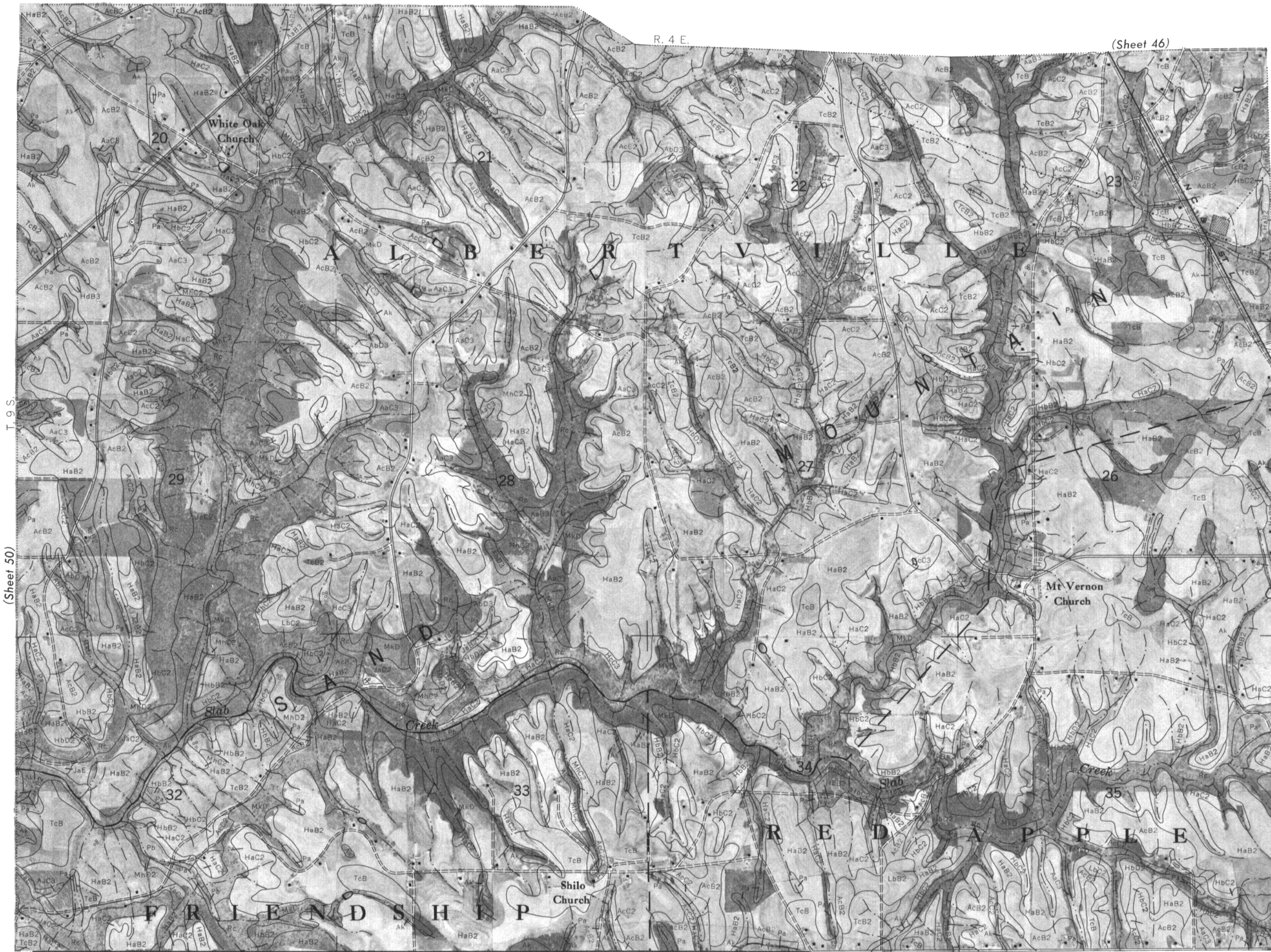

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

Scale 1:20 000

0 1/2 1 Mile

0 5000 Feet

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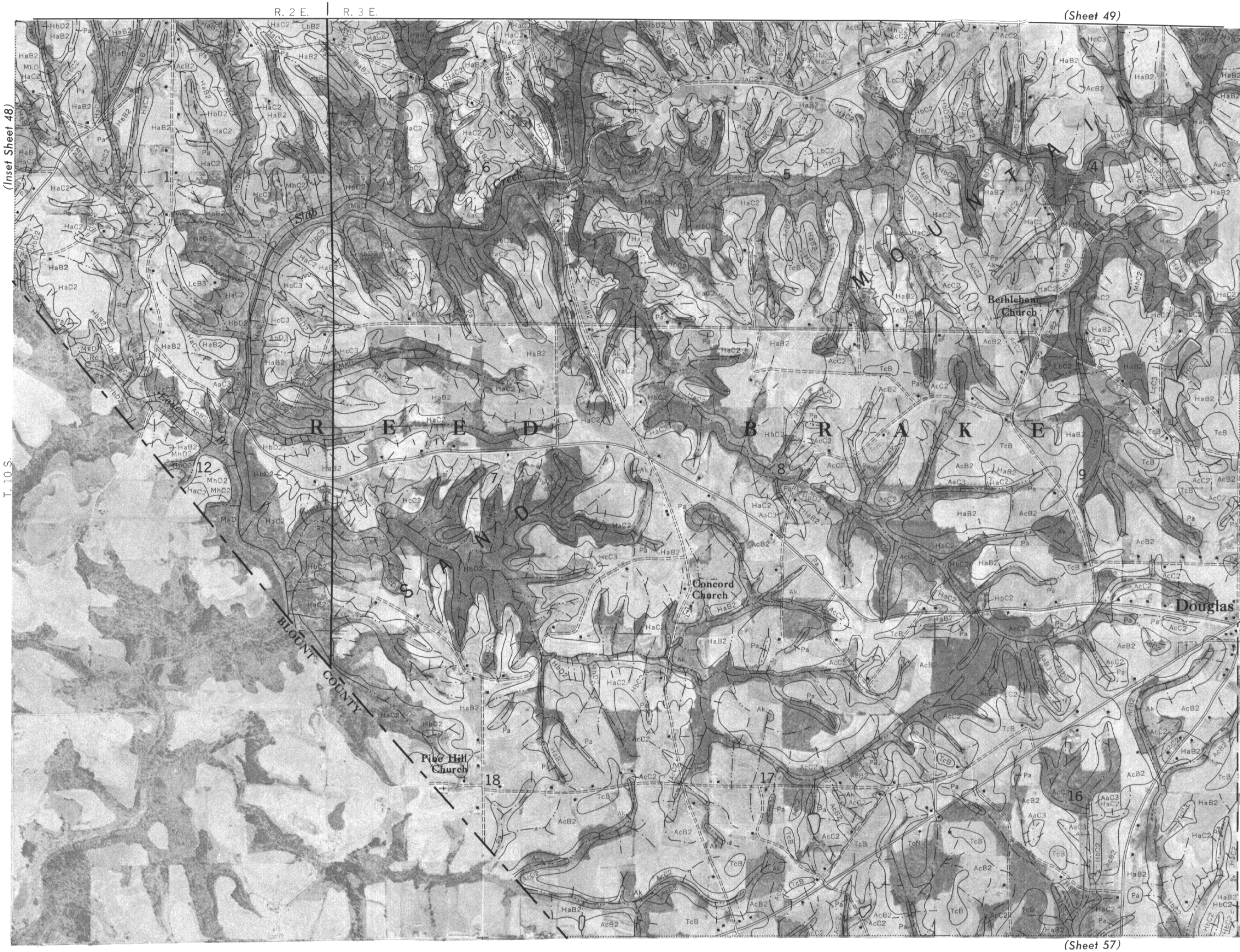
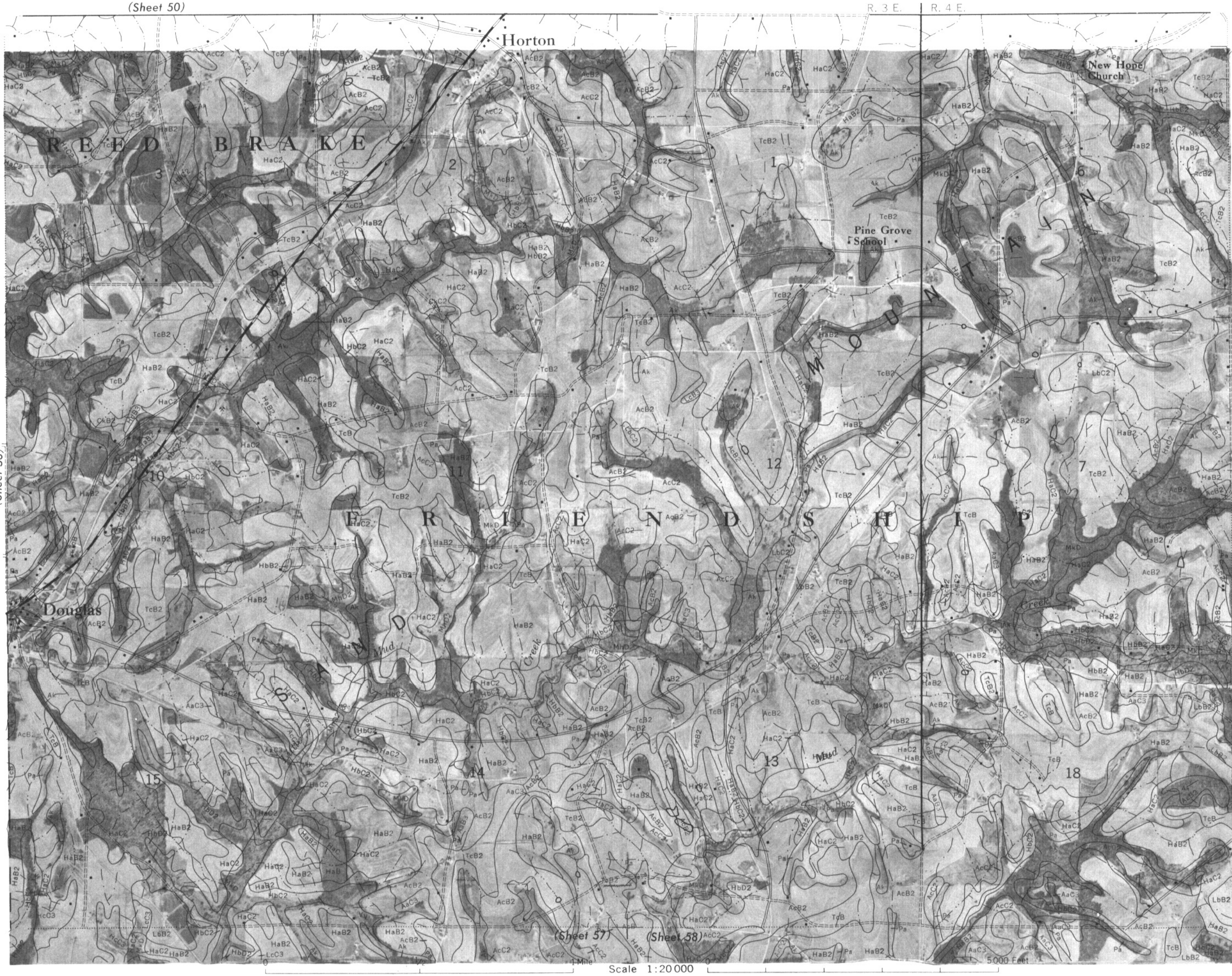


0 1/2 1 Mile Scale 1:20 000 0 5000 Feet

54



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(Sheet 51)

R. 4 E.

T. 10 S.

(Sheet 54)

(Sheet 56)

(Sheet 58)

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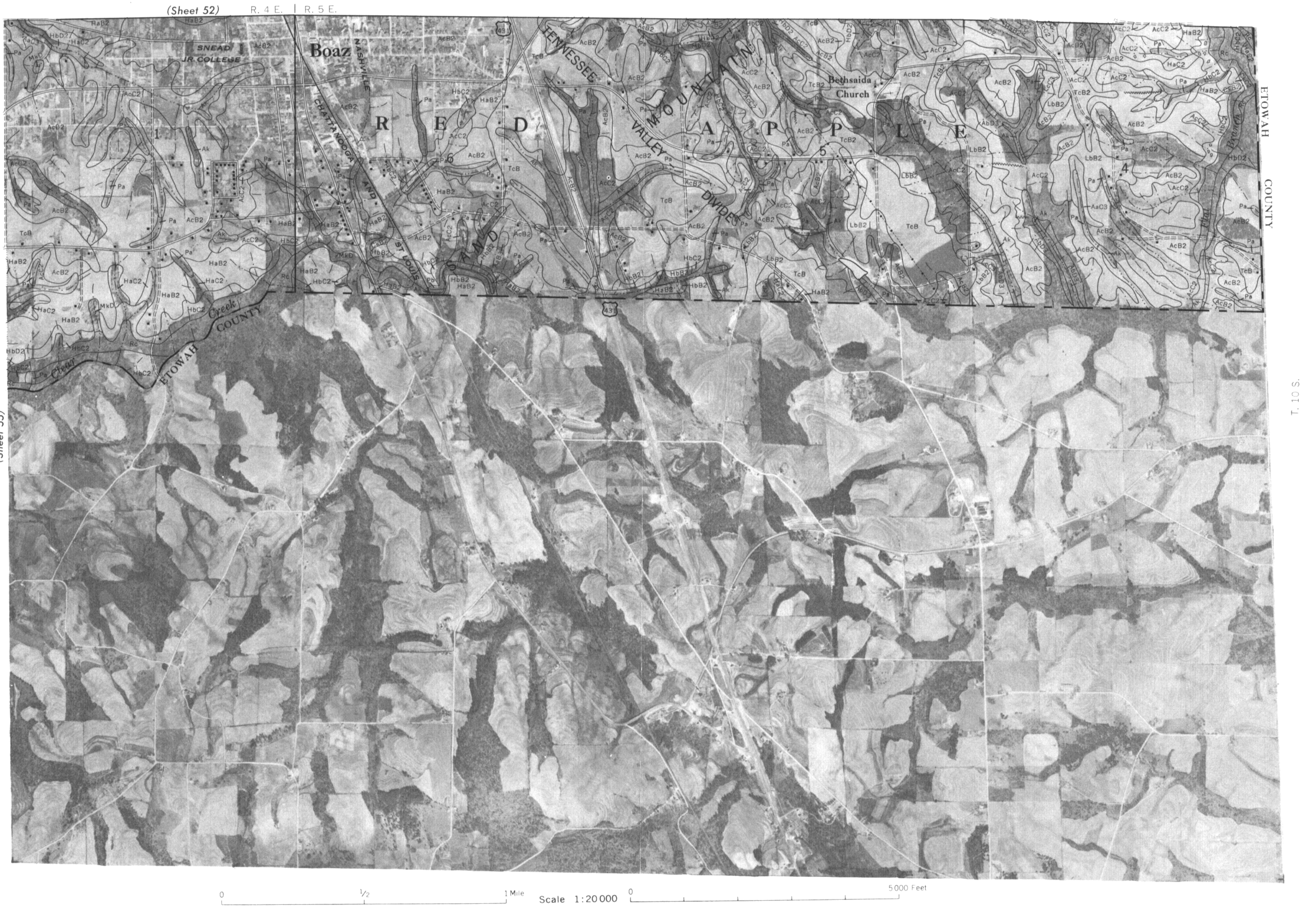

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(Sheet 53) (Sheet 54) R. 3 E.

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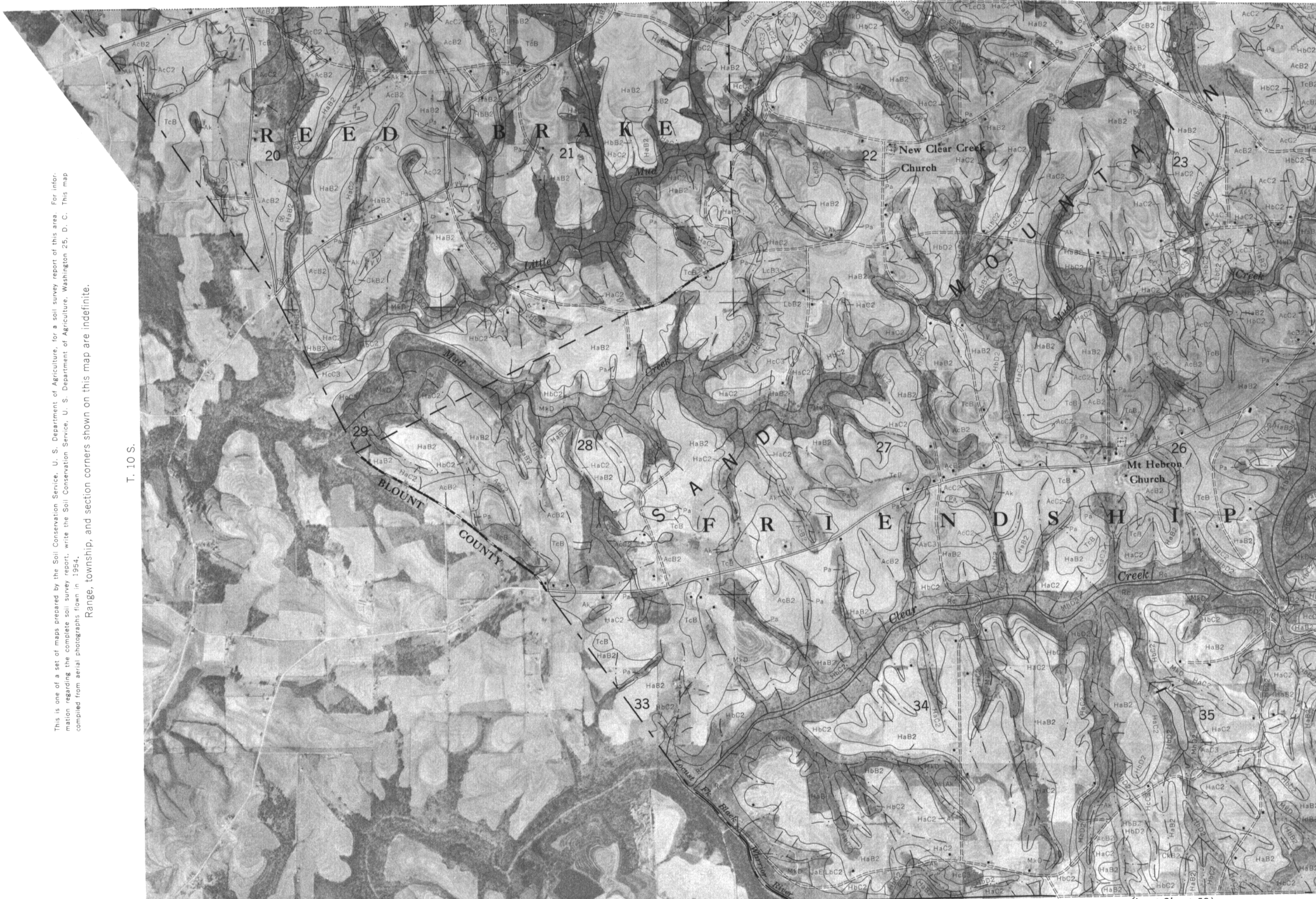
T. 10 S.



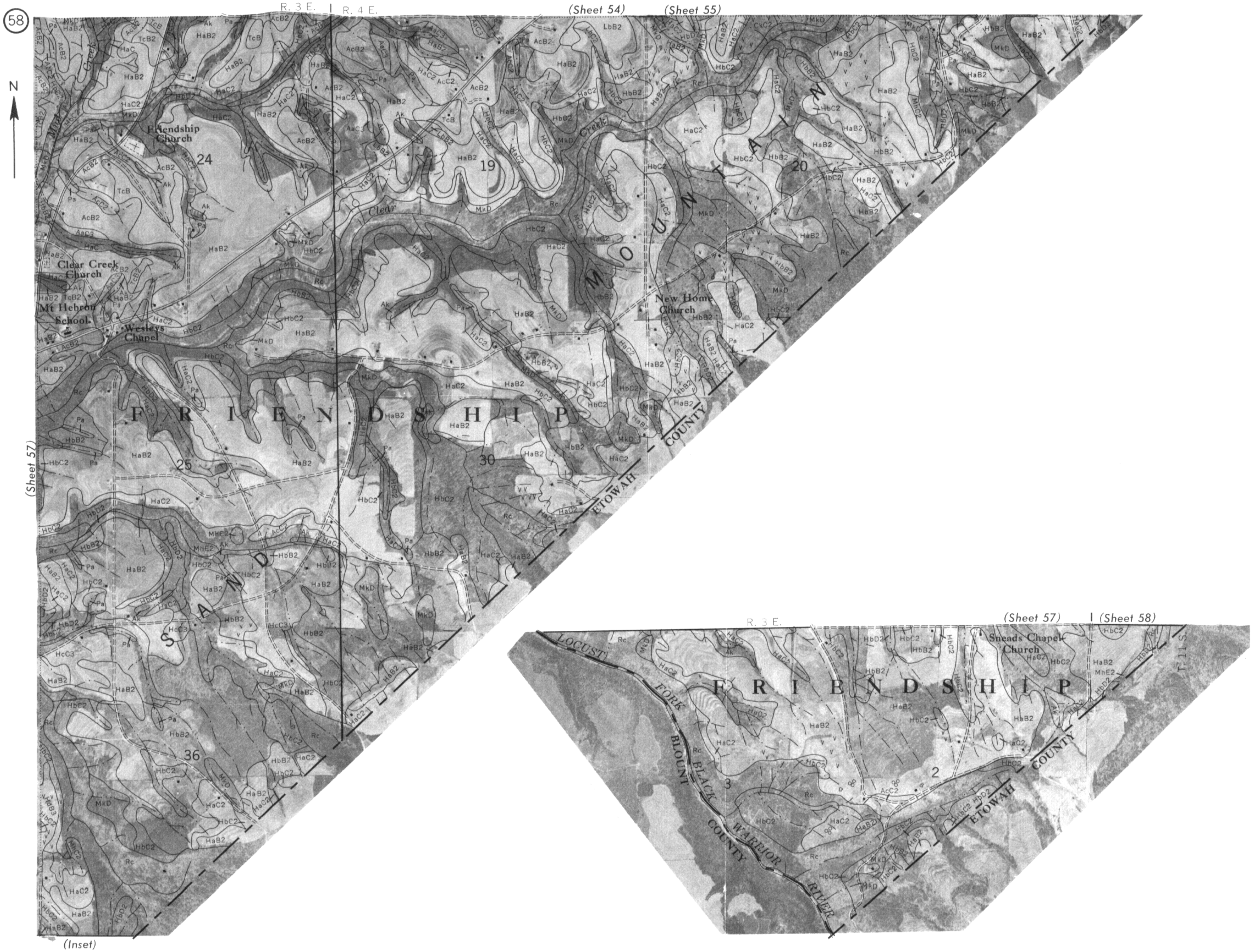
(Sheet 58)

(Inset Sheet 58)

Scale 1:20 000

0 1/2 1 Mile

0 5000 Feet



0 ½ 1 Mile

Scale 1:20 000

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T. 10 S.

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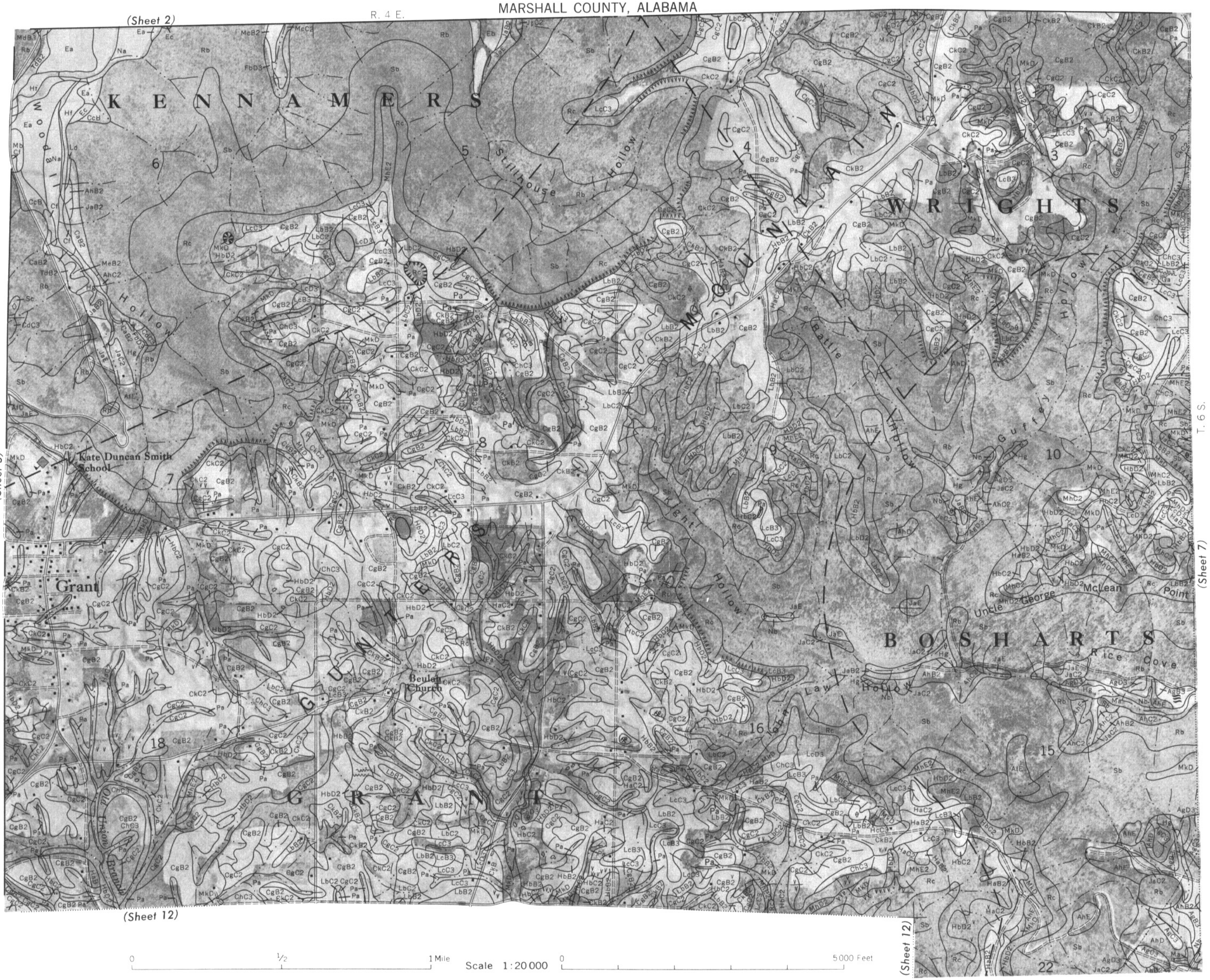
6



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(Sheet 3)

R. 4 E. | R. 5 E. MARSHALL COUNTY, ALABAMA

7

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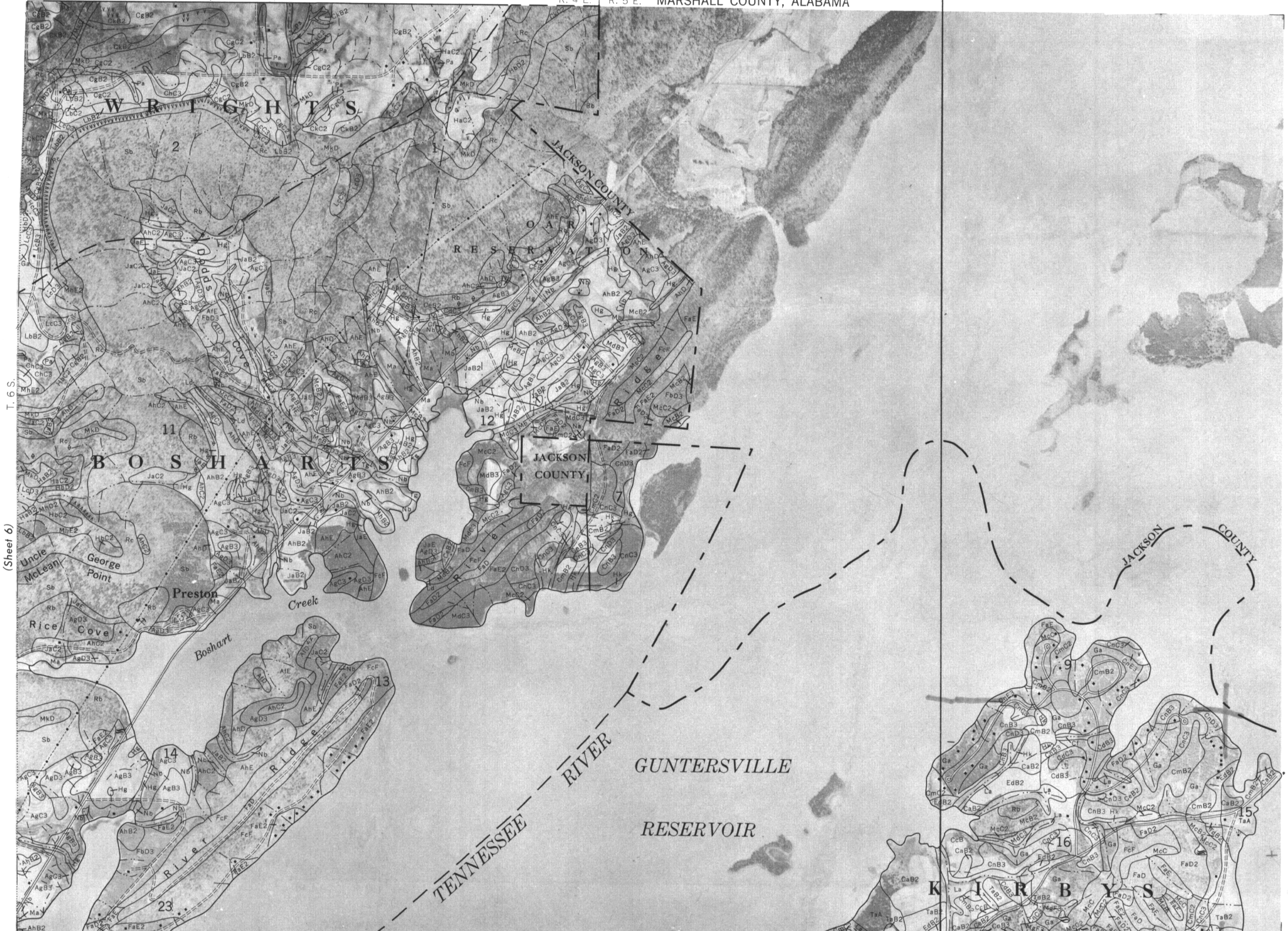
T. 6 S.

(Sheet 6)



N

5000 Feet

0

Scale 1:20000

1 Mile

½

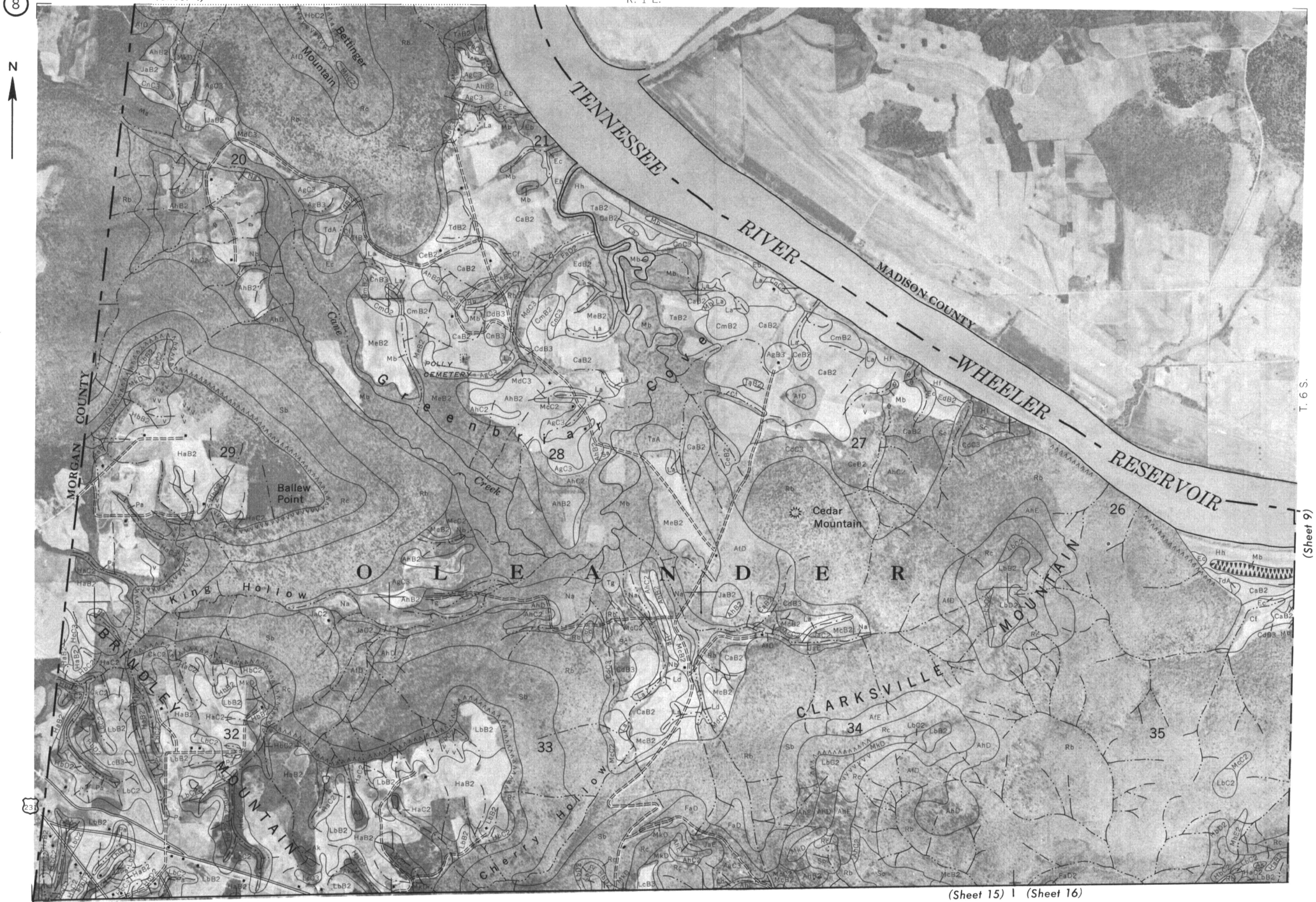
0

(Sheet 13) | (Sheet 14)

8

(Sheet 4)

R. 1 E.



T. 6 S.

(Sheet 9)

(Sheet 15) | (Sheet 16)

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N

0 1/2 1 Mile Scale 1:20000 0 5000 Feet

U. S. DEPARTMENT OF AGRICULTURE,
SOIL CONSERVATION SERVICE

MARSHALL COUNTY, ALABAMA

ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES
ALABAMA AGRICULTURAL EXPERIMENT STATION
TENNESSEE VALLEY AUTHORITY

SOILS LEGEND

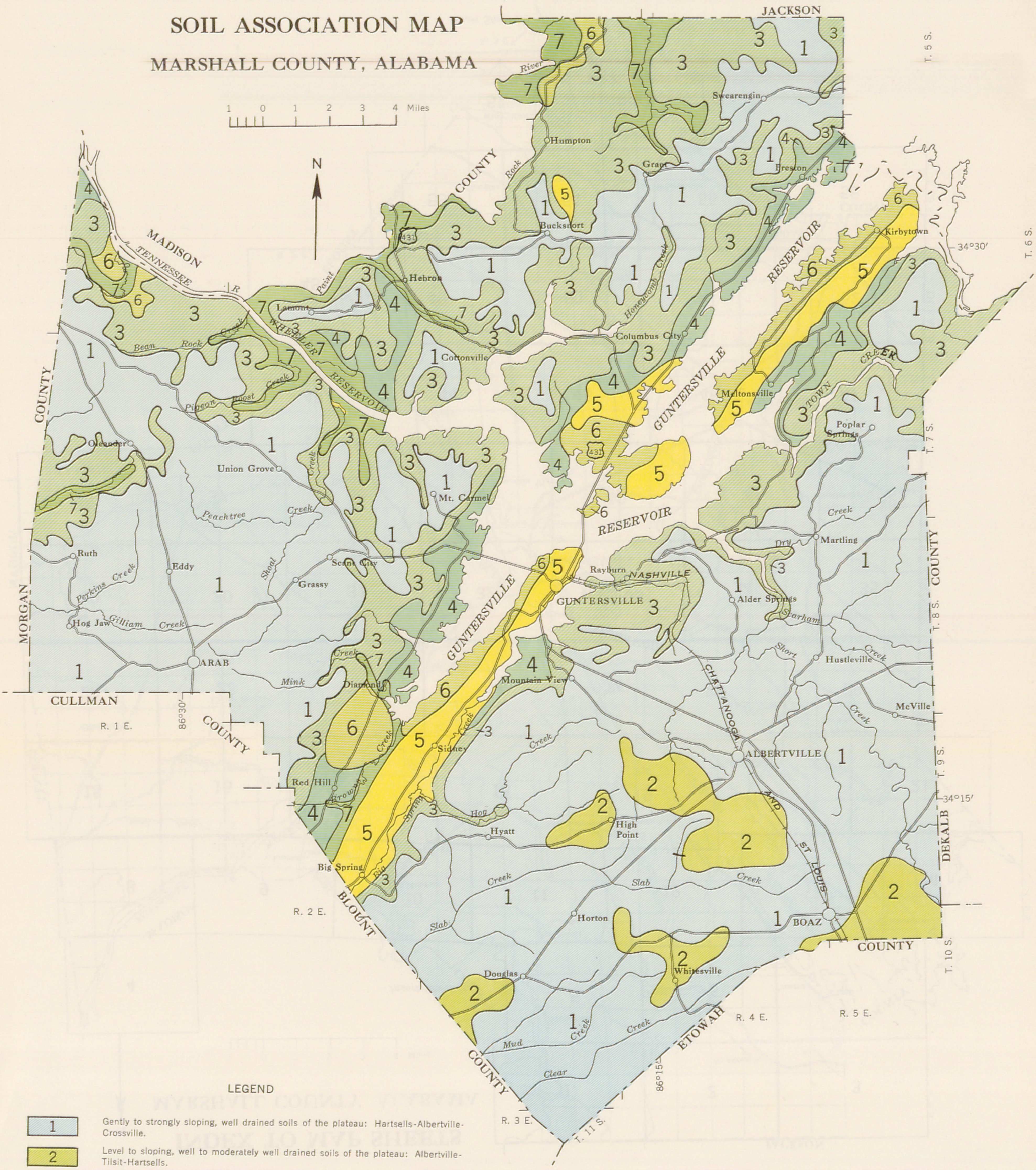
SYMBOL	NAME
AaB3	Albertville silty clay, severely eroded gently sloping phase
AaC3	Albertville silty clay, severely eroded sloping phase
AbC3	Albertville silty clay, severely eroded sloping shallow phase
AbD3	Albertville silty clay, severely eroded strongly sloping shallow phase
AcB2	Albertville very fine sandy loam, eroded gently sloping phase
AcC2	Albertville very fine sandy loam, eroded sloping phase
AdB2	Alcoa silt loam, eroded gently sloping phase
AdC2	Alcoa silt loam, eroded sloping phase
AeB3	Alcoa silty clay loam, severely eroded gently sloping phase
AeC3	Alcoa silty clay loam, severely eroded sloping phase
AfD	Allen and Jefferson stony fine sandy loams, strongly sloping phases
AfE	Allen and Jefferson stony fine sandy loams, moderately steep phases
AgB3	Allen-Waynesboro fine sandy clay loams, severely eroded gently sloping phases
AgC3	Allen-Waynesboro fine sandy clay loams, severely eroded sloping phases
AgD3	Allen-Waynesboro fine sandy clay loams, severely eroded strongly sloping phases
AhB2	Allen-Waynesboro fine sandy loams, eroded gently sloping phases
AhC2	Allen-Waynesboro fine sandy loams, eroded sloping phases
AhD	Allen-Waynesboro fine sandy loams, strongly sloping phases
AhE	Allen-Waynesboro fine sandy loams, moderately steep phases
Ak	Atkins soils
CaB2	Captina silt loam, eroded gently sloping phase
CbB3	Captina silty clay loam, severely eroded gently sloping phase
CcB	Captina-Colbert soils, gently sloping phases
CdB3	Colbert silty clay, severely eroded gently sloping phase
CdC3	Colbert silty clay, severely eroded sloping phase
CeB2	Colbert silty clay loam, eroded gently sloping phase
Cf	Colbert silty clay loam, overwash phase
CgB2	Crossville fine sandy loam, eroded gently sloping moderately deep phase
CgC2	Crossville fine sandy loam, eroded sloping moderately deep phase
ChC3	Crossville fine sandy clay loam, severely eroded sloping moderately deep phase
CkB2	Crossville loam, eroded gently sloping phase
CkC2	Crossville loam, eroded sloping phase
CmB2	Cumberland and Hermitage silt loams, eroded gently sloping phases
CmC2	Cumberland and Hermitage silt loams, eroded sloping phases
CnB3	Cumberland and Hermitage silty clay loams, severely eroded gently sloping phases
CnC3	Cumberland and Hermitage silty clay loams, severely eroded sloping phases
CnD3	Cumberland and Hermitage silty clay loams, severely eroded strongly sloping phases
CnE3	Cumberland and Hermitage silty clay loams, severely eroded moderately steep phases
Ea	Egam silty clay loam
Eb	Egam silty clay loam, sandy substratum phase
Ec	Egam-Newark silty clay loams
EdB2	Etowah loam, eroded gently sloping phase
FaD	Fullerton cherty silt loam, strongly sloping phase
FaD2	Fullerton cherty silt loam, eroded strongly sloping phase
FaE	Fullerton cherty silt loam, moderately steep phase
FaE2	Fullerton cherty silt loam, eroded moderately steep phase
FbD3	Fullerton cherty silty clay loam, severely eroded strongly sloping phase
FcF	Fullerton-Clarksville cherty silt loams, steep phases
Ga	Gullied land
HaB	Hartsells fine sandy loam, gently sloping phase
HaB2	Hartsells fine sandy loam, eroded gently sloping phase
HaC	Hartsells fine sandy loam, sloping phase
HaC2	Hartsells fine sandy loam, eroded sloping phase
HbB2	Hartsells fine sandy loam, eroded gently sloping shallow phase
HbC2	Hartsells fine sandy loam, eroded sloping shallow phase
HbD2	Hartsells fine sandy loam, eroded strongly sloping shallow phase
HcC3	Hartsells fine sandy clay loam, severely eroded sloping phase
HdB3	Hartsells fine sandy clay loam, severely eroded gently sloping shallow phase
He	Hollywood clay
Hf	Huntington fine sandy loam
Hg	Huntington loam, local alluvium phase
Hh	Huntington silt loam
Hk	Huntington silt loam, local alluvium phase
JaB2	Jefferson fine sandy loam, eroded gently sloping phase
JaC2	Jefferson fine sandy loam, eroded sloping phase
JaE	Jefferson fine sandy loam, moderately steep phase
La	Lindside silt loam, local alluvium phase
LbB2	Linker fine sandy loam, eroded gently sloping phase
LbC2	Linker fine sandy loam, eroded sloping phase
LbD2	Linker fine sandy loam, eroded strongly sloping phase
LcB3	Linker fine sandy clay loam, severely eroded gently sloping phase
LcC3	Linker fine sandy clay loam, severely eroded sloping phase
LcD3	Linker fine sandy clay loam, severely eroded strongly sloping phase
Ld	Lobelville cherty silt loam, local alluvium phase
Ma	Melvin fine sandy loam
Mb	Melvin silt loam and silty clay loam
McB	Minvale cherty silt loam, gently sloping phase
McB2	Minvale cherty silt loam, eroded gently sloping phase
McC	Minvale cherty silt loam, sloping phase
McC2	Minvale cherty silt loam, eroded sloping phase
MdB3	Minvale cherty silty clay loam, severely eroded gently sloping phase
MdC3	Minvale cherty silty clay loam, severely eroded sloping phase
MeB2	Monongahela fine sandy loam, eroded gently sloping phase
Mf	Monongahela fine sandy loam, overwash phase
MgF3	Montevallo shaly silt loam, severely eroded steep phase
MhC2	Muskingum fine sandy loam, eroded sloping phase
MhD2	Muskingum fine sandy loam, eroded strongly sloping phase
MhE2	Muskingum fine sandy loam, eroded moderately steep phase
MkD	Muskingum stony fine sandy loam, strongly sloping phase
Na	Newark fine sandy loam
Nb	Newark loam, local alluvium phase
Pa	Philo and Stendal soils, local alluvium phases
Pb	Pope fine sandy loam
Pc	Purdy fine sandy loam
Ra	Robertsville silty clay loam
Rb	Rockland, limestone
Rc	Rockland, sandstone
Sa	Sandy alluvial land, excessively drained
Sb	Stony colluvial land, Allen soil material
Sc	Stony smooth land, limestone
TaA	Taft silt loam, level phase
TaB2	Taft silt loam, eroded gently sloping phase
TbD2	Tellico and Upshur soils, eroded strongly sloping phases
TbE2	Tellico and Upshur soils, eroded moderately steep phases
TbF	Tellico and Upshur soils, steep phases
TcB	Tilsit very fine sandy loam, gently sloping phase
TcB2	Tilsit very fine sandy loam, eroded gently sloping phase
TdA	Tupelo silt loam, level phase
TdB2	Tupelo silt loam, eroded gently sloping phase
Te	Tupelo silt loam, overwash phase
TfB3	Tupelo silty clay loam, severely eroded gently sloping phase
Tg	Tyler fine sandy loam
WaB2	Wolftever silt loam, eroded gently sloping phase

Soil surveyed 1951-56 by K. E. Fussell, E. A. Perry, James A. Cotton, Robert B. McNutt, and W. J. Reeves, Soil Conservation Service, G. A. Swenson, Bureau of Plant Industry, Soils, and Agricultural Engineering, J. E. Paseur, Alabama Department of Agriculture and Industries.
Correlation by I. L. Martin, Soil Conservation Service.

Soil map constructed 1958 by Cartographic Division, Soil Conservation Service, USDA, from 1954 aerial photographs. Controlled mosaic based on Alabama plane coordinate system, east zone, transverse Mercator projection, 1927 North American datum.

SOIL ASSOCIATION MAP

MARSHALL COUNTY, ALABAMA



LEGEND

1	Gently to strongly sloping, well drained soils of the plateau: Hartsells-Albertville-Crossville.
2	Level to sloping, well to moderately well drained soils of the plateau: Albertville-Tilsit-Hartsells.
3	Sloping to steep stony soils and rockland of the plateau and valley: Stony colluvial land, Allen soil material-Rockland, limestone-Rockland, sandstone.
4	Gently sloping to moderately steep well drained soils of the valleys: Allen-Waynesboro-Cumberland–Hermitage–Minvale.
5	Strongly sloping to steep, well drained soils of the cherty ridges: Fullerton-Clarksville-Minvale–Tellico–Upshur.
6	Gently sloping soils on stream terraces: Captina-Taft-Tupelo-Colbert.
7	Nearly level soils on flood plains: Egam-Newark-Huntington-Melvin.

MARSHALL COUNTY, ALABAMA
CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. — 33

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Located object

Cotton gin

Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil
- U. S.
- Section line, corner
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
- Crossable with tillage implements
- Not crossable with tillage implements

Canals and ditches — CANAL, DITCH

Lakes and ponds
- Perennial
- Intermittent

Wells — flowing

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

Cave

SOIL SURVEY DATA

- Soil type outline and symbol — Dx
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land

Erosion
- Uneroded spot — U
- Sheet, moderate — S
- Sheet, severe — SS
- Gully, moderate — G
- Gully, severe — GG
- Sheet and gully, moderate — SG
- Wind, moderate
- Wind, severe
- Blowout
- Wind hummock
- Overblown soil

Gullies

Areas of alkali and salts
- Strong — A
- Moderate — M
- Slight — S
- Free of toxic effect — F
- Sample location — 26
- Saline spot